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(54) Title: DESIGN, SYNTHESIS AND USE OF SPECIFIC POLYAMIDE DNA-BINDING LIGANDS

(57) Abstract

The invention encompasses improved selective polyamides for binding to specific nucleotide sequences of double stranded DNA as well as methods for designing and synthesizing polyamide DNA binding ligands that are selective for an identified specific nucleotide sequence. The 3-hydroxy-N-methylpyrrole/N-methylpyrrole carboxamide pair specifically recognizes the T.A base pair, while the N-methylpyrrole/3-hydroxy-N-methylpyrrole pair recognizes A.T nucleotide pairs. Similarly, an N-methylimidizole/N-methylpyrrole carboxamide pair specifically recognizes the G.C nucleotide pair, and the N-methylpyrrole/N-methylimidizole carboxamide pair recognizes the C.G nucleotide pair.

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DESIGN, SYNTHESIS AND USE OF SPECIFIC POLYAMIDE DNA-BINDING LIGANDS

The U.S. Government has certain rights in this invention pursuant to Grant Nos. GM 26453, 27681 and 47530 awarded by the National Institute of Health.

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of PCT/US97/03332 filed February 20, 1997, Serial No. 08/853,522 filed May 8, 1997 and PCT/US 97/12722 filed July 21, 1997 which are continuation-in-part applications of Serial No. 08/837,524, filed April 21, 1997, Serial No. 08/607,078, filed February 26, 1996, provisional application Serial No. 60/042,022, filed April 16, 1997 and provisional application Serial No. 60/043,444, filed April 8, 1997.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to polyamides which bind to predetermined sequences in the minor groove of double stranded DNA.

Description of the Related Art

The design of synthetic ligands that read the information stored in the DNA double helix has been a long standing goal of chemistry. Cell-permeable small molecules which target predetermined DNA sequences are useful for the regulation of gene-expression. Oligodeoxynucleotides that recognize the major groove of double-helical DNA via triple-helix formation bind to a broad range of sequences with high affinity and specificity. Although oligonucleotides and their analogs have been shown to interfere with gene expression, the triple helix approach is limited to purine tracks and suffers from poor cellular uptake. The development of pairing rules for minor groove binding polyamides derived from N-methylpyrrole (Py) and N-methylimidazole (Im) amino acids provides another code to control sequence specificity. An Im/Py pair distinguishes G•C from C•G and both of these from A•T or T•A base pairs. Wade, W.S., Mrksich, M. & Dervan, P.B. describes the design of peptides that bind in the minor groove of DNA at 5'-(A,T)G(A,T)C(A,T)-3' sequences by a dimeric side-by-side motif. *J. Am. Chem. Soc.* **114**, 8783-8794 (1992); Mrksich, M. *et al.* describes antiparallel

side-by-side motif for sequence specific-recognition in the minor groove of DNA by the designed peptide 1-methylimidazole-2-carboxamidenetropsin. *Proc. Natl. Acad. Sci. USA* **89**, 7586-7590 (1992); Trauger, J.W., Baird, E. E. Dervan, P.B. describes the recognition of DNA by designed ligands at subnanomolar concentrations. *Nature* **382**, 559-561 (1996). A Py/Py pair specifies A•T from G•C but does not distinguish A•T from T•A. Pelton, J.G. & Wemmer, D.E. describes the structural characterization of a 2-1 distamycin A-d(CGCAAATTTGGC) complex by two-dimensional NMR. *Proc. Natl. Acad. Sci. USA* **86**, 5723-5727 (1989); White, S., Baird, E. E. & Dervan, P.B. Describes the effects of the A•T/T•A degeneracy of pyrrole-imidazole polyamide recognition in the minor groove of DNA. *Biochemistry* **35**, 12532-12537 (1996); White, S., Baird, E. E. & Dervan, P. B. describes the pairing rules for recognition in the minor groove of DNA by pyrrole-imidazole polyamides. *Chem. & Biol.* **4**, 569-578 (1997); White, S., Baird, E. E. & Dervan, P.B. describes the 5'-3' N-C orientation preference for polyamide binding in the minor groove. New methods of designing selective compounds and the resulting specific polyamide binding ligands that are designed to target an identified sequence of double stranded DNA are needed to overcome the A•T/T•A degeneracy of pyrrole-imidazole polyamide recognition.

SUMMARY OF THE INVENTION

It has been found that a new aromatic amino acid, 3-hydroxy-N-methylpyrrole (Hp) when incorporated into a polyamide and paired opposite Py, provides the means to discriminate A•T from T•A. Unexpectedly, the replacement of a single hydrogen atom on the pyrrole with a hydroxy group in a Hp/Py pair regulates the affinity and the specificity of a polyamide by an order of magnitude. Utilizing Hp together with Py and Im in polyamides to form four aromatic amino acid pairs (Im/Py, Py/Im, Hp/Py, and Py/Hp) provides a code to distinguish all four Watson-Crick base pairs in the minor groove of DNA.

The present invention provides a method for designing specific polyamides suitable for use as DNA-binding ligands, as well as compositions comprising such polyamides, that are selective for an identified target sequence of double stranded DNA. Preferably, the designed specific polyamides are characterized by a dissociation constant of less than 1 nM, as measured by DNase I footprint titration, and greater than ten-fold selectivity for the identified target

sequence over related mismatch sequences, based on the ratio of the corresponding dissociation constants measured by DNase I footprint titrations.

The invention encompasses improved polyamides for binding to the minor groove of double stranded ("duplex") DNA. The polyamides are in the form of a hairpin comprising two groups of at least three consecutive carboxamide residues, the two groups covalently linked by an aliphatic amino acid residue, preferably γ-aminobutyric acid or 2,4 diaminobutyric acid, the consecutive carboxamide residues of the first group pairing in an antiparallel manner with the consecutive carboxamide residues of the second group in the minor groove of double stranded DNA. The improvement relates to the inclusion of a binding pair of Hp/Py carboxamides in the polyamide to bind to a T•A base pair in the minor groove of double stranded DNA or Py/Hp carboxamide binding pair in the polyamide to bind to an A•T base pair in the minor groove of double stranded DNA. The improved polyamides have at least three consecutive carboxamide pairs for binding to at least three DNA base pairs in the minor groove of a duplex DNA sequence that has at least one A•T or T•A DNA base pair, the improvement comprising selecting a Hp/Py carboxamide pair to correspond to a T•A base pair in the minor groove or a Py/Hp carboxamide pair to bind to an A•T DNA base pair in the minor groove. Preferably the binding of the carboxamide pairs to the DNA base pairs modulates the expression of a gene.

In general, the method provides specific polyamides suitable for use as DNA-binding ligands that are selective for identified target sequences of double stranded DNA having a coding strand sequence of the form 5'-$WN_1N_2 \ldots N_mW$-3' where N is a nucleotide chosen from the group A, T, C and G, W is a nucleotide chosen from the group A and T, and with the coresponding paired antiparallel strand 3'-$W'N'_1N'_2 \ldots N'_mW'$-5' where N' is a nucleotide chosen from the group T, A, G and C respectively to form Watson-Crick pase pairs, W is a nucleotide chosen from the group T and A respectively to form Watson-Crick pase pairs, and m is an integer having a value from 3 to 6 inclusive.

The preferred corresponding designed specific polyamides resulting from this invention are of the form

$$X_1X_2 \ldots X_m\text{-}\gamma\text{-}X_{(m+1)} \ldots X_{(2m-1)}X_{2m}\text{-}\beta\text{-Dp}$$

wherein X_1, X_2, X_m, $X_{(m+1)}$, $X_{(2m-1)}$, and X_{2m} are carboxamide residues forming carboxamide binding pairs X_1/X_{2m}, $X_2/X_{(2m-1)}$, $X_m/X_{(m+1)}$, and γ is γ-aminobuytic acid or 2,4 diaminobutyric acid and Dp is dimethylaminopropylamide,

and where

carboxamide binding pair X_1/X_{2m} corresponds to base pair $N_1 \bullet N'_1$,

carboxamide binding pair $X_2/X_{(2m-1)}$ corresponds to base pair $N_2 \bullet N'_2$,

carboxamide binding pair $X_m/X_{(m+1)}$ corresponds to base pair $N_m \bullet N'_m$.

In general, the specific polyamide DNA-binding ligands were designed by using a method that comprises the steps of identifying the target DNA sequence 5'-W$N_1N_2 \ldots N_m$W-3'; representing the identified sequence as 5'-W***ab*** . . . ***x***W-3', wherein ***a*** is a first nucleotide to be bound by the X_1 carboxamide residue, ***b*** is a second nucleotide to be bound by the X_2 carboxamide residue, and ***x*** is the corresponding nucleotide to be bound by the X_m carboxamide residue; defining ***a*** as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified six base pair sequence.

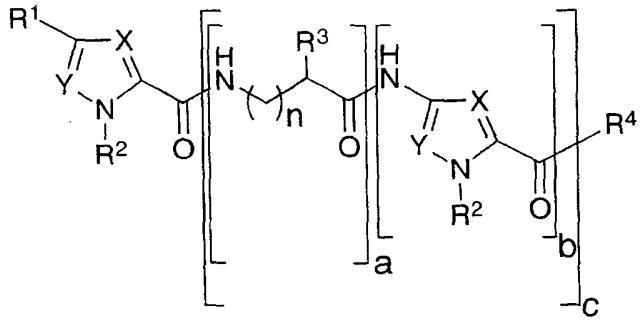
Carboxamide residues were selected sequentially as follows: Im was selected as the X_1 carboxamide residue and Py as the X_{2m} carboxamide residue if ***a*** was G. Py was selected as the X_1 carboxamide residue and Im as the X_{2m} carboxamide residue if ***a*** was C. Hp was selected as the X_1 carboxamide residue and Py as the X_{2m} carboxamide residue if ***a*** was T. Py was selected as the X_1 carboxamide residue and Hp as the X_{2m} carboxamide residue if ***a*** was A.

The remaining carboxamide residues were selected in the same fashion. Im was selected as the X_2 carboxamide residue and Py as the X_{2m-1} carboxamide residue if ***b*** was G. Py was selected as the X_2 carboxamide residue and Im as the X_{2m-1} carboxamide residue if ***b*** was C. Hp was selected as the X_2 carboxamide residue and Py as the X_{2m-1} carboxamide residue if ***b*** was T. Py was selected as the X_2 carboxamide residue and Hp as the X_{2m-1} carboxamide residue if ***b*** was A.

The selection of carboxamide residues was continued through m iterations. In the last iteration, Im was selected as the X_m carboxamide residue and Py as the X_{m+1} carboxamide residue if ***x*** was G. Py was selected as the X_m carboxamide residue and Im as the X_{m+1} carboxamide residue if ***x*** was C. Hp was selected as the X_m carboxamide residue and Py as the X_{m+1} carboxamide residue if ***x*** was T. Py was selected as the X_m carboxamide residue and Hp as the X_{m+1} carboxamide residue if ***x*** was A.

In one preferred embodiment, the polyamide includes at least four consecutive carboxamide pairs for binding to at least four base pairs in a duplex DNA sequence. In another preferred embodiment, the polyamide includes at least five consecutive carboxamide pairs for binding to at least five base pairs in a duplex DNA sequence. In yet another preferred embodiment, the polyamide includes at least six consecutive carboxamide pairs for binding to at least six base pairs in a duplex DNA sequence. In one preferred embodiment, the improved polyamides have four carboxamide binding pairs that will distinguish A•T, T•A, C•G and G•C base pairs in the minor groove of a duplex DNA sequence. The duplex DNA sequence can be a regulatory sequence, such as a promoter sequence or an enhancer sequence, or a gene sequence, such as a coding sequence or a non-coding sequence. Preferably, the duplex DNA sequence is a promoter sequence.

More specifically, "polyamide" refers to a polymer of polyamide subunits of the formula.



where R^1 is chosen from H, NH_2, SH, Cl, Br, F, N-acetyl, or N-formyl.

where R^2 is C_{1-100} alkyl (preferably C_{1-10} alkyl such as methyl, ethyl, isopropyl), C_{1-100} alkylamine (preferably C_{1-10} alkylamine such as ethylamine), C_{1-100} alkyldiamine (preferably C_{1-10} alkyldiamine such as N,N-dimethylpropylamine), a C_{1-100} alkylcarboxylate (preferably a C_{1-10} alkylcarboxylate such as-CH_2COOH), C_{1-100} alkenyl (preferably C_{1-10} alkenyl such as $CH_2CH=CH_2$), or a C_{1-100} alkynyl (preferably C1-10 alkynyl such as -$CH_2C\equiv CH_3$), or a $C_{1-100}L$, where L groups can be independently chosen from but is not limited to arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens to which an antibody binds, solid phase supports, oligodeoxynucleotide, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL-α-lipoic acid, acridine,

captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, tartaric acid, (+)-α-tocopheral. Most preferably R^2 is H, $(CH_2)_mCH_3$, $(CH_2)_mNH_2$, $(CH_2)_mSH$, $(CH_2)_mOH$, $(CH_2)_mNR^5{}_2$, $(CH_2)_mOR^5$, $(CH_2)_mSR^5$, where R^5 = $(CH_2)_mCH_3$, $(CH_2)_mNH_2$, $(CH_2)_mSH$, $(CH_2)_mOH$ and m is an integer from 0 to 6.

where R^3 is chosen from H, NH_2, OH, SH, Br, Cl, F, OMe, CH_2OH, CH_2SH, CH_2NH_2.

where R^4 is $-NH(CH_2)_{0\text{-}100}NR^6R^7$ or $NH(CH_2)_pCO\ NH(CH_2)_{0\text{-}100}NR^6R^7$ or NHR^6 or $NH(CH_2)_pCONHR^6$. Where R^6 and R^7 are independently chosen from H, Cl, NO, N-acetyl, benzyl, $C_{1\text{-}100}$ alkyl, $C_{1\text{-}100}$ alkylamine, $C_{1\text{-}100}$ alkyldiamine, $C_{1\text{-}100}$ alkylcarboxylate, $C_{1\text{-}100}$ alkenyl, a $C_{1\text{-}100}$ alkynyl, or a $C_{1\text{-}100}L$, where L groups can be independently chosen from but is not limited to arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens to which an antibody binds, solid phase supports, oligodeoxynucleotide, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL-α-lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, an oligodeoxynucleotide, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, tartaric acid, (+)-α-tocopheral. Where p is an integer value ranging from 0 to 12. In the preferred form of the present invention R^6 and R^7 are H, and the resulting amine modified polyamide is coupled to an amine reactive molecule in order to generate a bifunction polyamide conjugate.Where the amine reactive molecule is chosen from but not limited to the following: arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens to which an antibody binds , solid phase supports, an oligodeoxynucleotide, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL-α-lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, tartaric acid, (+)-α-tocopheral.

where X and Y are chosen from the following, N, CH, COH, CCH_3, CNH_2, CCl, CF.

a is an integer chosen from values of 0 or 1

b is an integer chosen integer values ranging from 1 to 5.

c is an integer value ranging from 2 to 10.

Hereinafter, N-methylpyrrolecarboxamide may be referred to as "Py", N-methylimidazolecarboxamide may be referred to as "Im", γ-aminobutyric acid may referred to as "γ", β-alanine may be referred to as "β", glycine may be referred to as "G",

dimethylaminopropylamide may be referred to as "Dp", and ethylenediaminetetraacetic acid may be referred to as "EDTA".

The preparation and the use of polyamides for binding in the minor groove of double stranded DNA are extensively described in the art. This invention is an improvement of the existing technology that uses 3-hydroxy-N-methylpyrrole to provide carboxamide binding pairs for DNA binding polyamides.

The invention encompasses polyamides having γ-aminobutyric acid or a substituted γ-aminobutyric acid to form a hairpin with a member of each carboxamide pairing on each side of it. Preferably the substituted γ-aminobutyric acid is a chiral substituted γ-aminobutyric acid such as (R)-2,4-diaminobutyric acid. In addition, the polyamides may contain an aliphatic amino acid residue, preferably a β-alanine residue, in place of a Hp or Py carboxamide. The β-alanine residue is represented in formulas as β. The β-alanine residue becomes a member of a carboxamide binding pair. The invention further includes the substitution as a β/β binding pair for non-Im containing binding pair. Thus, binding pairs in addition to the Im/Py, Py/Im, Hp/Py and Py/Hp are Im/β, β/Im, Py/β, β/Py, Hp/β, β/Hp, and β/β.

The polyamides of the invention can have additional moieties attached covalently to the polyamide. Preferably the additional moieties are attached as substituents at the amino terminus of the polyamide, the carboxy terminus of the polyamide, or at a chiral (R)-2,4-diaminobutyric acid residue. Suitable additional moieties include a detectable labeling group such as a dye, biotin or a hapten. Other suitable additional moieties are DNA reactive moieties that provide for sequence specific cleavage of the duplex DNA.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates the structure of polyamide **1**, **2**, and **3**.

Figure 2 illustrates the pairing of polyamides to DNA base pairs.

Figure 3 illustrates the DNase footprint titration of compounds **2** and **3**.

Figure 4 illustrates a list of the structures of representative Hp containing polyamides.

Figure 5 schematically illustrates a method for the design of eight carboxamide residue hairpin polyamide compounds suitable for recognition of 6-bp 5'-WNNNNW-3' sequences in the minor groove of double stranded DNA.

Figure 6 schematically illustrates a method for determining the position of an aromatic amino acid residue that should be replaced with a β-alanine residue in order to enhance the DNA binding properties of certain eight carboxamide residue hairpin polyamide compounds.

Figure 7 schematically illustrates a method for the design of ten carboxamide residue hairpin polyamide compounds suitable for recognition of 7-bp 5'-WNNNNNW-3' sequences in the minor groove of double stranded DNA.

Figure 8 schematically illustrates a method for determining the position of an aromatic amino acid residue that should be replaced with a β-alanine residue in order to enhance the DNA binding properties of certain ten carboxamide residue hairpin polyamide compounds.

Figure 9 schematically illustrates a method for determining the position of an additional aromatic amino acid residue that should be replaced with a β-alanine residue in order to enhance the DNA binding properties of certain ten carboxamide residue hairpin polyamide compounds.

Figure 10 schematically illustrates a method for the design of twelve carboxamide residue hairpin polyamide compounds suitable for recognition of 8-bp 5'-WNNNNW-3' sequences in the minor groove of double stranded DNA.

Figure 11 schematically illustrates a method for determining the position of an aromatic amino acid residue that should be replaced with a β-alanine residue in order to enhance the DNA binding properties of certain twelve carboxamide residue hairpin polyamide compounds.

DETAILED DESCRIPTION OF THE INVENTION

Within this application, unless otherwise stated, definitions of the terms and illustration of the techniques of this application may be found in any of several well-known references such as: Sambrook, J., *et al.*, *Molecular Cloning: A Laboratory Manual*, Cold Spring Harbor Laboratory Press (1989); Goeddel, D., *ed.*, *Gene Expression Technology*, *Methods in Enzymology*, **185**, Academic Press, San Diego, CA (1991); "Guide to Protein Purification" in Deutshcer, M.P., ed., *Methods in Enzymology*, Academic Press, San Diego, CA (1989); Innis, et al., *PCR Protocols: A Guide to Methods and Applications*, Academic Press, San Diego, CA (1990); Freshney, R.I., *Culture of Animal Cells: A Manual of Basic Technique, 2nd Ed.*, Alan Liss, Inc. New York, NY (1987); Murray, E.J., *ed.*, *Gene Transfer and Expression Protocols*, pp. 109-128, The Humana Press Inc., Clifton, NJ and Lewin, B., *Genes VI*, Oxford University Press, New York (1997).

For the purposes of this application, a *promoter* is a regulatory sequence of DNA that is involved in the binding of RNA polymerase to initiate transcription of a gene. A *gene* is a segment of DNA involved in producing a peptide, polypeptide or protein, including the coding region, non-coding regions preceding ("leader") and following ("trailer") the coding region, as well as intervening non-coding sequences ("introns") between individual coding segments ("exons"). Coding refers to the representation of amino acids, start and stop signals in a three base "triplet" code. Promoters are often upstream (" '5 to") the transcription initiation site of the corresponding gene. Other regulatory sequences of DNA in addition to promoters are known, including sequences involved with the binding of transcription factors, including response elements that are the DNA sequences bound by inducible factors. Enhancers comprise yet another group of regulatory sequences of DNA that can increase the utilization of promoters, and can function in either orientation (5'-3' or 3'-5') and in any location (upstream or downstream) relative to the promoter. Preferably, the regulatory sequence has a positive activity, i.e., binding of an endogeneous ligand (e.g. a transcription factor) to the regulatory sequence increases transcription, thereby resulting in increased expression of the corresponding target gene. In such a case, interference with transcription by binding a polyamide to a regulatory sequence would reduce or abolish expression of a gene.

The promoter may also include or be adjacent to a regulatory sequence known in the art as a *silencer*. A silencer sequence generally has a negative regulatory effect on expression of the gene. In such a case, expression of a gene may be increased directly by using a polyamide to prevent binding of a factor to a silencer regulatory sequence or indirectly, by using a polyamide to block transcription of a factor to a silencer regulatory sequence.

It is to be understood that the polyamides of this invention bind to double stranded DNA in a sequence specific manner. The function of a segment of DNA of a given sequence, such as 5'-TATAAA-3', depends on its position relative to other functional regions in the DNA sequence. In this case, if the sequence 5'-TATAAA-3' on the coding strand of DNA is positioned about 30 base pairs upstream of the transcription start site, the sequence forms part of the promoter region (Lewin, *Genes VI,* pp. 831-835). On the other hand, if the sequence 5'-TATAAA-3' is downstream of the transcription start site in a coding region and in proper

register with the reading frame, the sequence encodes the tyrosyl and lysyl amino acid residues (Lewin, *Genes VI*, pp. 213-215).

While not being held to one hypothesis, it is believed that the binding of the polyamides of this invention modulate gene expression by altering the binding of DNA binding proteins, such as RNA polymerase, transcription factors, TBF, TFIIIB and other proteins. The effect on gene expression of polyamide binding to a segment of double stranded DNA is believed to be related to the function, e.g., promoter, of that segment of DNA.

It is to be understood by one skilled in the art that the improved polyamides of the present invention may bind to any of the above-described DNA sequences or any other sequence having a desired effect upon expression of a gene. In addition, U.S. Patent No. 5,578,444 describes numerous promoter targeting sequences from which base pair sequences for targeting an improved polyamide of the present invention may be identified.

It is generally understood by those skilled in the art that the basic structure of DNA in a living cell includes both *major* and a *minor groove*. For the purposes of describing the present invention, the *minor groove* is the narrow groove of DNA as illustrated in common molecular biology references such as Lewin, B., *Genes VI*, Oxford University Press, New York (1997).

To affect gene expression in a cell, which may include causing an increase or a decrease in gene expression, a effective quantity of one or more polyamide is contacted with the cell and internalized by the cell. The cell may be contacted *in vivo* or *in vitro*. Effective extracellular concentrations of polyamides that can modulate gene expression range from about 10 nanomolar to about 1 micromolar. Gottesfeld, J.M., *et al.*, *Nature* **387** 202-205 (1997). To determine effective amounts and concentrations of polyamides *in vitro*, a suitable number of cells is plated on tissue culture plates and various quantities of one or more polyamide are added to separate wells. Gene expression following exposure to a polyamide can be monitored in the cells or medium by detecting the amount of the protein gene product present as determined by various techniques utilizing specific antibodies, including ELISA and western blot. Alternatively, gene expression following exposure to a polyamide can be monitored by detecting the amount of messenger RNA present as determined by various techniques, including northern blot and RT-PCR.

Similarly, to determine effective amounts and concentrations of polyamides for *in vivo* administration, a sample of body tissue or fluid, such as plasma, blood, urine, cerebrospinal fluid, saliva, or biopsy of skin, muscle, liver, brain or other appropriate tissue source is analyzed. Gene expression following exposure to a polyamide can be monitored by detecting the amount of the protein gene product present as determined by various techniques utilizing specific antibodies, including ELISA and western blot. Alternatively, gene expression following exposure to a polyamide can be monitored by the detecting the amount of messenger RNA present as determined by various techniques, including northern blot and RT-PCR.

The polyamides of this invention may be formulated into diagnostic and therapeutic compositions for *in vivo* or *in vitro* use. Representative methods of formulation may be found in *Remington: The Science and Practice of Pharmacy*, 19th ed., Mack Publishing Co., Easton, PA (1995).

For *in vivo* use, the polyamides may be incorporated into a physiologically acceptable pharmaceutical composition that is administered to a patient in need of treatment or an animal for medical or research purposes. The polyamide composition comprises pharmaceutically acceptable carriers, excipients, adjuvants, stabilizers, and vehicles. The composition may be in solid, liquid, gel, or aerosol form. The polyamide composition of the present invention may be administered in various dosage forms orally, parentally, by inhalation spray, rectally, or topically. The term parenteral as used herein includes, subcutaneous, intravenous, intramuscular, intrasternal, infusion techniques or intraperitoneally.

The selection of the precise concentration, composition, and delivery regimen is influenced by, *inter alia*, the specific pharmacological properties of the particular selected compound, the intended use, the nature and severity of the condition being treated or diagnosed, the age, weight, gender, physical condition and mental acuity of the intended recipient as well as the route of administration. Such considerations are within the purview of the skilled artisan. Thus, the dosage regimen may vary widely, but can be determined routinely using standard methods.

Polyamides of the present invention are also useful for detecting the presence of double stranded DNA of a specific sequence for diagnostic or preparative purposes. The sample containing the double stranded DNA can be contacted by polyamide linked to a solid substrate, thereby isolating DNA comprising a desired sequence. Alternatively, polyamides linked to a suitable detectable marker, such as biotin, a hapten, a radioisotope or a dye molecule, can be contacted by a sample containing double stranded DNA.

The design of bifunctional sequence specific DNA binding molecules requires the integration of two separate entities: recognition and functional activity. Polyamides that specifically bind with subnanomolar affinity to the minor groove of a predetermined sequence of double stranded DNA are linked to a functional molecule, providing the corresponding bifunctional conjugates useful in molecular biology, genomic sequencing, and human medicine. Polyamides of this invention can be conjugated to a variety of functional molecules, which can be independently chosen from but is not limited to arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens to which an antibody binds, solid phase supports, oligodeoxynucleotides, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL-α-lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, tartaric acid, (+)-α-tocopheral, psoralen, EDTA, methidium, acridine, Ni(II)•Gly-Gly-His, TO, Dansyl, pyrene, N-bromoacetamide, and gold particles. Such bifunctional polyamides are useful for DNA affinity capture, covalent DNA modification, oxidative DNA cleavage, and DNA photocleavage. Such bifunctional polyamides are useful for DNA detection by providing a polyamide linked to a detectable label. Detailed instructions for synthesis of such bifunctional polyamides can be found in copending U.S. provisional application 60/043,444, the teachings of which are incorporated by reference.

DNA complexed to a labeled polyamide can then be determined using the appropriate detection system as is well known to one skilled in the art. For example, DNA associated with a polyamide linked to biotin can be detected by a streptavidin / alkaline phosphatase system.

The present invention also describes a diagnostic system, preferably in kit form, for assaying for the presence of the double stranded DNA sequence bound by the polyamide of this invention in a body sample, such brain tissue, cell suspensions or tissue sections, or body fluid

samples such as CSF, blood, plasma or serum, where it is desirable to detect the presence, and preferably the amount, of the double stranded DNA sequence bound by the polyamide in the sample according to the diagnostic methods described herein.

The diagnostic system includes, in an amount sufficient to perform at least one assay, a specific polyamide as a separately packaged reagent. Instructions for use of the packaged reagent(s) are also typically included. As used herein, the term "package" refers to a solid matrix or material such as glass, plastic (e.g., polyethylene, polypropylene or polycarbonate), paper, foil and the like capable of holding within fixed limits a polyamide of the present invention. Thus, for example, a package can be a glass vial used to contain milligram quantities of a contemplated polyamide or it can be a microliter plate well to which microgram quantities of a contemplated polyamide have been operatively affixed, i.e., linked so as to be capable of being bound by the target DNA sequence. "Instructions for use" typically include a tangible expression describing the reagent concentration or at least one assay method parameter such as the relative amounts of reagent and sample to be admixed, maintenance time periods for reagent or sample admixtures, temperature, buffer conditions and the like. A diagnostic system of the present invention preferably also includes a detectable label and a detecting or indicating means capable of signaling the binding of the contemplated polyamide of the present invention to the target DNA sequence. As noted above, numerous detectable labels, such as biotin, and detecting or indicating means, such as enzyme-linked (direct or indirect) streptavidin, are well known in the art.

As used herein, "subnanomolar affinity" means binding that is characterized by a dissociation constant, K_d, of less than 1 nM, as measured by DNase I footprint titration. Preferably, polyamides of the present invention are characterized by subnanomolar binding affinity for the identified target DNA sequence. As used herein, the "selectivity" of the binding of a polyamide to a DNA sequence is the ratio of the dissociation constant, K_d, as measured by DNase I footprint titration of binding the polyamide to a mismatch DNA sequence divided by the corresponding dissociation constant of the binding of the polyamide to the identified target DNA sequence. Preferably, polyamides of the present invention are characterized by a selectivity of 5 or greater, more preferably a selectivity of greater that 10.

The exemplary polyamide that illustrates the compositions and methods of the present invention is polyamide **3** of Figure 1, ImImHpPy-γ-ImPyPyPy-β-Dp. This polyamide was designed according to the method of the present invention to target the identified sequence 5'-WGGTCW-3'. See Table 5, below, Sequence No. 36 and the corresponding sequence of carboxamide binding pairs. Polyamide **3** binds an identified target sequence 5'-TGGTCA-3' with a dissociation constant, as measured by DNase I footprint titration, of 0.48 nM, i.e., with subnanomolar affinity as defined herein (see Table 1, below). The polyamide binds to the mismatch sequence 5'-TGGACA-3' with a dissociation contant of 37 nM, yielding a selectivity, as defined herein, of 77 (Table 1).

Figure 1 shows representative structures of polyamides. ImImPyPy-γ-ImPyPyPy-β-Dp (**1**), ImImPyPy-γ-ImHpPyPy-β-Dp (**2**), and ImImHpPy-γ-ImPyPyPy-β-Dp (**3**). (Hp = 3-hydroxy-N-methylpyrrole, Im = N-methylimidazole, Py = N-methylpyrrole, β = β-alanine, γ = γ-aminobutyric acid, Dp = Dimethylaminopropylamide). Polyamides were synthesized by solid phase methods using Boc-protected 3-methoxypyrrole, imidazole, and pyrrole aromatic amino acids, cleaved from the support by aminolysis, deprotected with sodium thiophenoxide, and purified by reversed phase HPLC. Baird, E. E. & Dervan, P. B. describes the solid phase synthesis of polyamides containing imidazole and pyrrole amino acids. *J. Am. Chem. Soc.* **118**, 6141-6146 (1996); *also see* PCT US 97/003332. The identity and purity of the polyamides were verified by ^{1}H NMR, analytical HPLC, and matrix-assisted laser-desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS-monoisotopic): **1** 1223.6 (1223.6 calculated), **2** 1239.6 (1239.6 calculated); **3** 1239.6 (1239.6 calculated).

Figure 2 illustrates binding models for polyamides **1-3** in complex with 5'-TGGTCA-3' and 5'-TGGACA-3' (A•T and T•A in fourth position highlighted). Filled and unfilled circles represent imidazole and pyrrole rings respectively; circles containing an H represent 3-hydroxypyrrole, the curved line connecting the polyamide subunits represents γ-aminobutyric acid, the diamond represents β-alanine, and the + represents the positively charged dimethylaminopropylamide tail group.

Figure 3 shows quantitative DNase I footprint titration experiments with polyamides **2** and **3** on the 3' ^{32}P labeled 250-bp pJK6 *Eco*RI/*Pvu*II restriction fragment. Lane 1, intact DNA; lanes 2-11 DNase I digestion products in the presence of 100, 50, 20, 10, 5, 2, 1, 0.5, 0.2, 0.1 nM

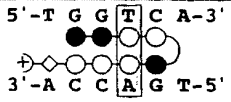
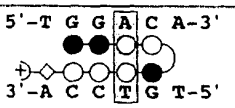
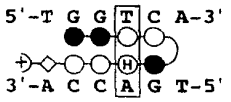
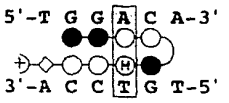
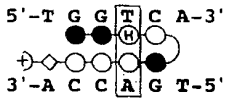
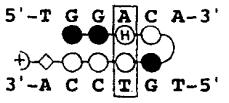
polyamide, respectively; lane 12, DNase I digestion products in the absence of polyamide; lane 13, adenine-specific chemical sequencing. Iverson, B. L. & Dervan, P. B. describes an adenine-specific DNA chemical sequencing reaction. *Methods Enzymol.* **15**, 7823-7830 (1987). All reactions were done in a total volume of 400 μL. A polyamide stock solution or H_2O was added to an assay buffer containing radiolabeled restriction fragment, with the final solution conditions of 10 mM Tris-HCl, 10 mM KCl, 10 mM $MgCl_2$, 5 mM $CaCl_2$, pH 7.0. Solutions were allowed to equilibrate for 4-12 h at 22 °C before initiation of footprinting reactions. Footprinting reactions, separation of cleavage products, and data analysis were carried out as described. White, S., Baird, E. E. & Dervan, P. B. Effects of the A•T/T•A degeneracy of pyrrole-imidazole polyamide recognition in the minor groove of DNA. *Biochemistry 35,* 12532-12537 (1996).

Figure 4 shows the structure and equilibrium dissociation constant for numerous compounds of the present invention. Polyamides are shown in complex with their respective match site. Filled and unfilled circles represent imidazole (Im) and pyrrole (Py) rings, respectively; circles containing an H represent 3-hydroxypyrrole (Hp), the curved line connecting the polyamide subunits represents γ-aminobutyric acid (γ), the diamond represents β-alanine (β), and the + represents the positively charged dimethylaminopropylamide tail group (Dp). The equilibrium dissociation constants are the average values obtained from three DNase I footprint titration experiments. The standard deviation for each set is less than 15% of the reported number. Assays were carried out in the presence of 10 mM Tris•HCl, 10 mM KCl, 10 mM $MgCl_2$, and 5 mM $CaCl_2$ at pH 7.0 and 22°C.

Four-ring polyamide subunits, covalently coupled to form eight-ring hairpin structures, bind specifically to 6-bp target sequences at subnanomolar concentrations. Trauger, J.W., Baird, E. E. & Dervan, P.B. describe the recognition of DNA by designed ligands at subnanomolar concentrations. *Nature* **382**, 559-561 (1996); Swalley, S. E., Baird, E. E. & Dervan, P. B. describe the discrimination of 5'-GGGG-3', 5'-GCGC-3', and 5'-GGCC'3' sequences in the minor groove of DNA by eight-ring hairpin polyamides. *J. Am. Chem. Soc.* **119**, 6953-6961 (1997). The DNA-binding affinities of three eight-ring hairpin polyamides shown in Figure 1 as compound **1, 2,** and **3** containing pairings of Im/Py, Py/Im opposite G•C, C•G and either Py/Py, Hp/Py, or Py/Hp at a common single point opposite T•A and A•T has been determined. Equilibrium dissociation constants (K_d) for ImImPyPy-γ-ImPyPyPy-β-Dp **1**, ImImPyPy-γ-ImHpPyPy-β-Dp **2**, ImImHpPy-γ-ImPyPyPy-β-Dp **3** of Figure 1 are shown in Table 1. Brenowitz, M., Senear, D. F., Shea, M. A. & Ackers, G. K. describe a quantitative DNase footprint titration method for studying protein-DNA interactions. *Methods Enzymol.* **130**, 132-

181 (1986); The K_d values were determined by quantitative DNase I footprint titration experiments: on a 3' ^{32}P-labeled 250-bp DNA fragment containing the target sites, 5'-TGGACA-3' and 5'-TGGTCA-3' which differ by a single A•T base pair in the fourth position. The DNase footprint gels are shown in Figure 3.

TABLE 1 Equilibrium dissociation constants*

	Polyamide†	5'-TGGTCA-3'	5'-TGGACA-3'	K_{rel}‡
1	Py/Py	 K_d = 0.077 nM	 K_d = 0.15 nM	2.0
2	Py/Hp	 K_d = 15 nM	 K_d = 0.83 nM	0.06
3	Hp/Py	 K_d = 0.48 nM	 K_d =37 nM	77

*The reported dissociation constants are the average values obtained from three DNase I footprint titration experiments. The standard deviation for each data set is less than 15% of the reported number. Assays were carried out in the presence of 10 mM Tris•HCl, 10 mM KCl, 10 mM $MgCl_2$, and 5 mM $CaCl_2$ at pH 7.0 and 22 °C.
†Ring pairing opposite T•A and A•T in the fourth position.
‡Calculated as K_d(5'-TGGACA-3')/K_d(5'-TGGTCA-3').

Based on the pairing rules for polyamide-DNA complexes both of these sequences are a match for control polyamide **1** which places a Py/Py pairing opposite A•T and T•A at both sites. It was determined that polyamide **1** (Py/Py) binds to 5'-TGGTCA-3' and 5'-TGGACA-3' within a factor of 2 (K_d = 0.077 or 0.15 nM respectively). In contrast, polyamide **2** (Py/Hp) binds to 5'-TGGTCA-3' and 5'-TGGACA-3' with dissociation constants which differ by a factor of 18 (K_d = 15 nM and 0.83 nM respectively). By reversing the pairing in polyamide **3** (Hp/Py) the dissociation constants differ again in the opposite direction by a factor of 77 (K_D = 0.48 nM and 37 nM respectively). Control experiments performed on separate DNA fragments; reveal that neither a 5'-TGGGCA-3' or a 5'-TGGCCA-3' site is bound by polyamide **2** or **3** at concentrations ≤ 100 nM, indicating that the Hp/Py and Py/Hp ring pairings do not bind opposite G•C or C•G.

The specificity of polyamides **2** and **3** for sites which differ by a single A•T/T•A base pair results from small chemical changes. Replacing the Py/Py pair in **1** with a Py/Hp pairing as in **2**, a single substitution of C3-OH for C3-H, destabilizes interaction with 5'-TGGTCA-3' by 191-fold, a free energy difference of 3.1 kcal mol^{-1}. Interaction of **2** with 5'-TGGACA-3' is destabilized only 6-fold relative to **1**, a free energy difference of 1.1 kcal mol^{-1}. Similarly,

replacing the Py/Py pair in **1** with Hp/Py as in **3** destabilizes interaction with 5'-TGGACA-3' by 252-fold, a free energy difference of 3.2 kcal mol^{-1}. Interaction of **3** with 5'TGGTCA-3' is destabilized only 6-fold relative to **1**, a free energy difference of 1.0 kcal mol^{-1}.

The polyamides of this invention provide for coded targeting of predetermined DNA sequences with affinity and specificity comparable to sequence-specific DNA binding proteins. Hp, Im, and Py polyamides complete the minor groove recognition code using three aromatic amino acids which combine to form four ring pairings (Im/Py, Py/Im, Hp/Py, and Py/Hp) which complement the four Watson-Crick base pairs, as shown in TABLE 2. There are a possible 240 four base pair sequences which contain at least 1 A•T or T•A base pair and therefore can advantageously use an Hp/Py, or Py/Hp carboxamide binding. Polyamides binding to any of these sequences can be designed in accordance with the code of TABLE 2.

TABLE 2 Pairing code for minor groove recognition*

Pair	G•C	C•G	T•A	A•T
Im/Py	+	-	-	-
Py/Im	-	+	-	-
Hp/Py	-	-	+	-
Py/Hp	-	-	-	+

* favored (+), disfavored (-)

For certain G•C rich sequences the affinity of polyamide•DNA complexes may be enhanced by substitution of an Im/β pair for Im/Py at G•C and β/Im for Py/Im at C•G. At A•T and T•A base pairs, either a Py/β, β/Py, Hp/β, β/Hp, and β/β may be used. The alternate aliphatic/aromatic amino acid pairing code is described in Table 3.

TABLE 3 Aliphatic/Aromatic substitution for ring pairings*

Pair	Substitution
Im/Py	Im/β
Py/Im	β/Im
Hp/Py	Py/β, β/Py, Hp/β, β/β
Py/Hp	Py/β, β/Py, β/Hp, β/β

U. S. Patent 5,578,444 describes numerous promoter region targeting sequences from which base pair sequences for targeting a polyamide can be identified.

PCT U.S. 97/003332 describes methods for synthesis of polyamides which are suitable for preparing polyamides of this invention. The use of β-alanine in place of a pyrrole amino acid in the synthetic methods provides aromatic/aliphatic pairing (Im/β, β/Im, Hp/β, β/Hp, Py/β, and β/Py) and aliphatic/aliphatic pairing (β/β) substitution. The use of γ-aminobutyric acid, or a substituted γ-aminobutyric acid such as (R)-2,4 diaminobutyric acid, provides for preferred hairpin turns. The following examples illustrate the synthesis of polyamides of the present invention.

The process of designing a preferred polyamide molecule $X_1X_2X_3X_4$-γ-$X_5X_6X_7X_8$ comprising eight aromatic amino acid residues of this invention is shown schematically in Figure 5. The polyamide design process provides a method for designing an eight carboxamide residue molecule comprising four carboxamide binding pairs for detection and binding of a target six base pair 5'-WNNNNW-3' sequence in the minor groove of double stranded DNA. The design process identifies an appropriate polyamide ligand for recognition of a predetermined 6-bp, 5'-WNNNNW-3' sequence with subnanomolar affinity and >10-fold specificity versus mismatch sites. Trauger, J.W., Baird, E. E. Dervan, P.B. describes the recognition of DNA by designed ligands at subnanomolar concentrations. *Nature* **382**, 559-561 (1996).

In order to prepare a polyamide molecule specific for an identified six base pair sequence of double stranded DNA, a user starts the 8-ring polyamide design process that implements the minor groove recognition pairing code summarized in Table 2 above. In the design process a 5'-WNNNNW-3' sequence was identified. In a preferred embodiment, the identified sequence was located within a gene promoter. U. S. Patent 5,578,444 describes numerous promoter region targeting sequences from which target six base pair sequences for targeting a polyamide can be identified. The identified sequence was then defined as 5'-W***abcd***W-3' in a stepwise process wherein ***a***, ***b***, ***c***, and ***d***, were sequentially and independently defined as A, G, C, or T. The structure of the polyamide molecule was then correspondingly defined by sequentially chosing antiparallel carboxamide binding pairs according to the minor groove pairing code summarized in Table 2 above. Thus, if ***a*** was G, then X_1 was defined as Im, and X_8 was defined as Py. If ***a*** was C, then X_1 was defined as Py, and X_8 was defined as Im. If ***a*** was T, then X_1 was defined

as Hp, and X_8 was defined as Py. If ***a*** was A, then X_1 was defined as Py, and X_8 was defined as Hp.

Similarly, ***b*** was defined as A, G, C, or T and corresponding carboxamide binding pairs were defined. According to the same rules, if ***b*** was G, then X_2 was defined as Im, and X_7 was defined as Py. If ***b*** was C, then X_2 was defined as Py, and X_7 was defined as Im. Likewise, if ***b*** was T, then X_2 was defined as Hp, and X_7 was defined as Py. If ***b*** was A, then X_2 was defined as Py, and X_7 was defined as Hp.

The next step was to define ***c*** as A, G, C, or T and then define corresponding carboxamide binding pairs. Following the same rules, if ***c*** was G, then X_3 was defined as Im, and X_6 was defined as Py. If ***c*** was C, then X_3 was defined as Py, and X_6 was defined as Im. Similarly, if ***c*** was T, then X_3 was defined as Hp, and X_6 was defined as Py. If ***c*** was A, then X_3 was defined as Py, and X_6 was defined as Hp. Lastly, ***d*** was defined as A, G, C, or T and the last corresponding carboxamide binding pair was defined. According to above rules, if ***d*** was G, then X_4 was defined as Im, and X_5 was defined as Py. If ***d*** was C, then X_4 was defined as Py, and X_5 was defined as Im. If ***d*** was T, then X_4 was defined as Hp, and X_5 was defined as Py. If ***d*** was A, then X_4 was defined as Py, and X_5 was defined as Hp.

With all eight carboxamide residues that participate in binding pairs now defined, the designed polyamide $X_1X_2X_3X_4$-γ-$X_5X_6X_7X_8$ suitable for binding to the identified sequence was synthesized using known techniques. Baird, E. E. & Dervan, P. B. describes the solid phase synthesis of polyamides containing imidazole and pyrrole amino acids. *J. Am. Chem. Soc.* **118,** 6141-6146 (1996); *also see* PCT US 97/003332.

The binding affinity of the synthesized polyamide to the identified sequence was determined using a quantitative DNase footprint titration method for studying protein-DNA interactions described by Brenowitz, M., Senear, D. F., Shea, M. A. & Ackers, G. K., *Methods Enzymol.* **130**, 132-181 (1986). If the affinity of the synthesized polyamide at the target site was not subnanomolar affinity then adding a β-alanine (process A) was considered in order to optimize the exact positions of the binding pairs of aromatic amino acids. If the affinity of the said polyamide at said target site was subnanomolar affinity then the sequence specificity of the polyamide versus mismatch sequences was determined. If the specificity versus mismatch sites

was not > 10-fold specificity then adding a β-alanine (process A schematically shown in Figure 6) was considered, in order to optimize the positions of the aromatic amino acids in relationship to the base pairs in the minor groove. Specificity of the polyamide molecule for the target identified sequence versus mismatch sequence sites of greater than 10-fold was considered a successful result of design process.

The 256 polyamide molecules comprising four carboxamide binding pairs that were designed using this method are useful for binding to the 256 target 5'-NNNN-3' core sequences, and are listed in Tables 4-11. A corresponding polyamide molecule was designed for each DNA sequence (1-240) and (G1-G16) using the process outlined above and shown schematically in Figure 5.

If the synthesized polyamide molecule did not bind to the target identified sequence with subnanomolar affinity or if the synthesized polyamide molecule did not exhibit a specificity for the target identified sequence versus mismatch sequence sites of greater than 10-fold, the option of substituting an aliphatic amino acid residues for one of the carboxamide residues was considered. The preferred aliphatic amino acid residue is β-alanine. At least one aliphatic amino acid residue such as a β-alanine residue provided some flexibility to the central portion of the polyamide molecule, acting as a "spring" to permit optimization of the hydrogen bonding between the carboxamide binding pairs and the nucleotide bases of the double stranded DNA.

In general, it was not found to be advantageous to replace either member of the terminal carboxamide binding pair, X_1/X_8, with β-alanine. Similarly, β-alanine was not substituted for members of the binding pair, X_4/X_5, adjacent to the γ hairpin residue. β-alanine residues were not substituted for N-methylimidazole residues. The use of β-alanine in place of a pyrrole or 3-hydroxypyrrole amino acid residue provides aromatic/aliphatic pairing (Im/β, β/Im, Hp/β, β/Hp, Py/β, and β/Py) and aliphatic/aliphatic pairing (β/β) substitution.

The method for selecting which pyrrole amino acid to substitute with β-alanine is schematically illustrated in Figure 6. Selective placement of an aliphatic β-alanine (β) residue paired with either a pyrrole (Py), 3-hydroxypyrrole (Hp), or imidazole (Im) aromatic amino acid or another β-alanine residue is found to compensate for sequence composition effects to improve

recognition and binding of the minor groove of DNA by pyrrole-imidazole polyamides of the present invention. If an all-ring polyamide has been found to have an affinity which is not subnanomolar, or a specificity versus mismatch sequences which is less than 10-fold it may be caused by DNA sequence-composition effects which can be reduced by replacement of an aromatic amino acid with an aliphatic β-alanine residue. In a polyamide molecule that comprises four binding pairs it is only beneficial to place β-alanine in positions X_2, X_3, X_6, and X_7. No more than two β-alanine residues may be placed within a single hairpin structure. No more than a single β-residue may be placed within each individual polyamide subunit, e.g., if X_2 is replaced with β-alanine, then X_3 cannot be replaced.

These rules and others were implemented in the method schematically illustrated in Figure 6. This process is suitable for the refinement of the design polyamide comprising four binding pairs that has been designed by the method illustrated in Figure 5, but which lacks subnanomolar affinity or greater than 10-fold specificity at the identified target DNA sequence. As in the basic design method, the designed polyamides are synthesized and the affinity and specificity of binding to the target DNA were determined.

For a given polyamide molecule $X_1X_2X_3X_4$-γ-$X_5X_6X_7X_8$ there are five possible outcomes for the process of substituting a β-alanine residue for an aromatic amino acid residue. First, there may be no position at which it is possible to add a β-alanine residue; in such case, a better binding affinity or selectivity can be sought in the design and synthesis of a polyamide with five or six carboxamide binding pairs, described below. Second, the process may result in a derivative which contains a single β-alanine substitution (such derivatives are numbered according to the parent numbering scheme such that a single β-derivative of compound 5 would be called 5β), which is sufficient to produce subnanomolar binding affinity and >10-fold specificity, and at which point the process is deemed complete.

Third, the process of Figure 5 may result in a polyamide which contains a single β-alanine substitution which is not sufficient to produce subnanomolar binding affinity and >10-fold specificity, but where there are no additional positions in which it is possible to substitute a β-alanine residue, and in such a case a polyamide with five or six carboxamide binding pairs, should be designed and synthesized, as described below. Fourth, the process of Figure 5 may

result in a polyamide that contains a single β-alanine substitution that is not sufficient to produce subnanomolar binding affinity and >10-fold specificity, but where there is an additional position for β-alanine substitution that does produce a polyamide with the criterion level of affinity and selectivity and therefore the design process is deemed complete. Polyamides that were designed by the process that produces polyamide molecules that contain two β-alanine residues are labeled β2 in Tables 12-19.

A fifth possibility is that substitution at a second position by the method illustrated in Figure 6 with a second β-alanine residue is not sufficient to produce a polyamide having the subnanomolar binding affinity and >10-fold specificity, and a polyamide with five or six carboxamide binding pairs, should be designed and synthesized, as described below. Tables 12-19 list polyamides corresponding to sequences 1-240 and G1-G16 which contain either one or two β-alanine residues.

TABLE 4: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WGWNNW-3'

	DNA sequence	aromatic amino acid sequence
1)	5'-W G T T T W-3'	ImHpHpHp-γ-PyPyPyPy
2)	5'-W G T T A W-3'	ImHpHpPy-γ-HpPyPyPy
3)	5'-W G T T G W-3'	ImHpHpIm-γ-PyPyPyPy
4)	5'-W G T T C W-3'	ImHpHpPy-γ-ImPyPyPy
5)	5'-W G T A T W-3'	ImHpPyHp-γ-PyHpPyPy
6)	5'-W G T A A W-3'	ImHpPyPy-γ-HpHpPyPy
7)	5'-W G T A G W-3'	ImHpPyIm-γ-PyHpPyPy
8)	5'-W G T A C W-3'	ImHpPyPy-γ-ImHpPyPy
9)	5'-W G T G T W-3'	ImHpImHp-γ-PyPyPyPy
10)	5'-W G T G A W-3'	ImHpImPy-γ-HpPyPyPy
11)	5'-W G T G G W-3'	ImHpImIm-γ-PyPyPyPy
12)	5'-W G T G C W-3'	ImHpImPy-γ-ImPyPyPy
13)	5'-W G T C T W-3'	ImHpPyHp-γ-PyImPyPy
14)	5'-W G T C A W-3'	ImHpPyPy-γ-HpImPyPy
15)	5'-W G T C G W-3'	ImHpPyIm-γ-PyImPyPy
16)	5'-W G T C C W-3'	ImHpPyPy-γ-ImImPyPy
17)	5'-W G A T T W-3'	ImPyHpHp-γ-PyPyHpPy
18)	5'-W G A T A W-3'	ImPyHpPy-γ-HpPyHpPy
19)	5'-W G A T G W-3'	ImPyHpIm-γ-PyPyHpPy
20)	5'-W G A T C W-3'	ImPyHpPy-γ-ImPyHpPy
21)	5'-W G A A T W-3'	ImPyPyHp-γ-PyHpHpPy
22)	5'-W G A A A W-3'	ImPyPyPy-γ-HpHpHpPy
23)	5'-W G A A G W-3'	ImPyPyIm-γ-PyHpHpPy
24)	5'-W G A A C W-3'	ImPyPyPy-γ-ImHpHpPy
25)	5'-W G A G T W-3'	ImPyImHp-γ-PyPyHpPy
26)	5'-W G A G A W-3'	ImPyImPy-γ-HpPyHpPy
27)	5'-W G A G G W-3'	ImPyImIm-γ-PyPyHpPy
28)	5'-W G A G C W-3'	ImPyImPy-γ-ImPyHpPy
29)	5'-W G A C T W-3'	ImPyPyHp-γ-PyImHpPy
30)	5'-W G A C A W-3'	ImPyPyPy-γ-HpImHpPy
31)	5'-W G A C G W-3'	ImPyPyIm-γ-PyImHpPy
32)	5'-W G A C C W-3'	ImPyPyPy-γ-ImImHpPy

TABLE 5: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WGSNNW-3'

	DNA sequence	aromatic amino acid sequence
33)	5'-W G G T T W-3'	ImImHpHp-γ-PyPyPyPy
34)	5'-W G G T A W-3'	ImImHpPy-γ-HpPyPyPy
35)	5'-W G G T G W-3'	ImImHpIm-γ-PyPyPyPy
36)	5'-W G G T C W-3'	ImImHpPy-γ-ImPyPyPy
37)	5'-W G G A T W-3'	ImImPyHp-γ-PyHpPyPy
38)	5'-W G G A A W-3'	ImImPyPy-γ-HpHpPyPy
39)	5'-W G G A G W-3'	ImImPyIm-γ-PyHpPyPy
40)	5'-W G G A C W-3'	ImImPyPy-γ-ImHpPyPy
41)	5'-W G G G T W-3'	ImImImHp-γ-PyPyPyPy
42)	5'-W G G G A W-3'	ImImImPy-γ-HpPyPyPy
43)	5'-W G G C T W-3'	ImImPyHp-γ-PyImPyPy
44)	5'-W G G C A W-3'	ImImPyPy-γ-HpImPyPy
45)	5'-W G C T T W-3'	ImPyHpHp-γ-PyPyImPy
46)	5'-W G C T A W-3'	ImPyHpPy-γ-HpPyImPy
47)	5'-W G C T G W-3'	ImPyHpIm-γ-PyPyImPy
48)	5'-W G C T C W-3'	ImPyHpPy-γ-ImPyImPy
49)	5'-W G C A T W-3'	ImPyPyHp-γ-PyHpImPy
50)	5'-W G C A A W-3'	ImPyPyPy-γ-HpHpImPy
51)	5'-W G C A G W-3'	ImPyPyIm-γ-PyHpImPy
52)	5'-W G C A C W-3'	ImPyPyPy-γ-ImHpImPy
53)	5'-W G C G T W-3'	ImPyImHp-γ-PyPyImPy
54)	5'-W G C G A W-3'	ImPyImPy-γ-HpPyImPy
55)	5'-W G C C T W-3'	ImPyPyHp-γ-PyImImPy
56)	5'-W G C C A W-3'	ImPyPyPy-γ-HpImImPy
G1)	5'-W G G G G W-3'	ImImImIm-γ-PyPyPyPy
G2)	5'-W G G G C W-3'	ImImImPy-γ-ImPyPyPy
G3)	5'-W G G C G W-3'	ImImPyIm-γ-PyImPyPy
G4)	5'-W G G C C W-3'	ImImPyPy-γ-ImImPyPy
G5)	5'-W G C G G W-3'	ImPyImIm-γ-PyPyImPy
G6)	5'-W G C G C W-3'	ImPyImPy-γ-ImPyImPy
G7)	5'-W G C C G W-3'	ImPyPyIm-γ-PyImImPy
G8)	5'-W G C C C W-3'	ImPyPyPy-γ-ImImImPy

TABLE 6: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WTWNNW-3'

	DNA sequence	aromatic amino acid sequence
57)	5'-W T T T T W-3'	HpHpHpHp-γ-PyPyPyPy
58)	5'-W T T T A W-3'	HpHpHpPy-γ-HpPyPyPy
59)	5'-W T T T G W-3'	HpHpHpIm-γ-PyPyPyPy
60)	5'-W T T T C W-3'	HpHpHpPy-γ-ImPyPyPy
61)	5'-W T T A T W-3'	HpHpPyHp-γ-PyHpPyPy
62)	5'-W T T A A W-3'	HpHpPyPy-γ-HpHpPyPy
63)	5'-W T T A G W-3'	HpHpPyIm-γ-PyHpPyPy
64)	5'-W T T A C W-3'	HpHpPyPy-γ-ImHpPyPy
65)	5'-W T T G T W-3'	HpHpImHp-γ-PyPyPyPy
66)	5'-W T T G A W-3'	HpHpImPy-γ-HpPyPyPy
67)	5'-W T T G G W-3'	HpHpImIm-γ-PyPyPyPy
68)	5'-W T T G C W-3'	HpHpImPy-γ-ImPyPyPy
69)	5'-W T T C T W-3'	HpHpPyHp-γ-PyImPyPy
70)	5'-W T T C A W-3'	HpHpPyPy-γ-HpImPyPy
71)	5'-W T T C G W-3'	HpHpPyIm-γ-PyImPyPy
72)	5'-W T T C C W-3'	HpHpPyPy-γ-ImImPyPy
73)	5'-W T A T T W-3'	HpPyHpHp-γ-PyPyHpPy
74)	5'-W T A T A W-3'	HpPyHpPy-γ-HpPyHpPy
75)	5'-W T A T G W-3'	HpPyHpIm-γ-PyPyHpPy
76)	5'-W T A T C W-3'	HpPyHpPy-γ-ImPyHpPy
77)	5'-W T A A T W-3'	HpPyPyHp-γ-PyHpHpPy
78)	5'-W T A A A W-3'	HpPyPyPy-γ-HpHpHpPy
79)	5'-W T A A G W-3'	HpPyPyIm-γ-PyHpHpPy
80)	5'-W T A A C W-3'	HpPyPyPy-γ-ImHpHpPy
81)	5'-W T A G T W-3'	HpPyImHp-γ-PyPyHpPy
82)	5'-W T A G A W-3'	HpPyImPy-γ-HpPyHpPy
83)	5'-W T A G G W-3'	HpPyImIm-γ-PyPyHpPy
84)	5'-W T A G C W-3'	HpPyImPy-γ-ImPyHpPy
85)	5'-W T A C T W-3'	HpPyPyHp-γ-PyImHpPy
86)	5'-W T A C A W-3'	HpPyPyPy-γ-HpImHpPy
87)	5'-W T A C G W-3'	HpPyPyIm-γ-PyImHpPy
88)	5'-W T A C C W-3'	HpPyPyPy-γ-ImImHpPy

TABLE 7: 8-ring Hairpin Polyamides for recognition of 6-bp 5`-WTSNNW-3`

	DNA sequence	aromatic amino acid sequence
89)	5'-W T G T T W-3'	HpImHpHp-γ-PyPyPyPy
90)	5'-W T G T A W-3'	HpImHpPy-γ-HpPyPyPy
91)	5'-W T G T G W-3'	HpImHpIm-γ-PyPyPyPy
92)	5'-W T G T C W-3'	HpImHpPy-γ-ImPyPyPy
93)	5'-W T G A T W-3'	HpImPyHp-γ-PyHpPyPy
94)	5'-W T G A A W-3'	HpImPyPy-γ-HpHpPyPy
95)	5'-W T G A G W-3'	HpImPyIm-γ-PyHpPyPy
96)	5'-W T G A C W-3'	HpImPyPy-γ-ImHpPyPy
97)	5'-W T G G T W-3'	HpImImHp-γ-PyPyPyPy
98)	5'-W T G G A W-3'	HpImImPy-γ-HpPyPyPy
99)	5'-W T G C T W-3'	HpImPyHp-γ-PyImPyPy
100)	5'-W T G C A W-3'	HpImPyPy-γ-HpImPyPy
101)	5'-W T G G G W-3'	HpImImIm-γ-PyPyPyPy
102)	5'-W T G G C W-3'	HpImImPy-γ-ImPyPyPy
103)	5'-W T G C G W-3'	HpImPyIm-γ-PyImPyPy
104)	5'-W T G C C W-3'	HpImPyPy-γ-ImImPyPy
105)	5'-W T C T T W-3'	HpPyHpHp-γ-PyPyImPy
106)	5'-W T C T A W-3'	HpPyHpPy-γ-HpPyImPy
107)	5'-W T C T G W-3'	HpPyHpIm-γ-PyPyImPy
108)	5'-W T C T C W-3'	HpPyHpPy-γ-ImPyImPy
109)	5'-W T C A T W-3'	HpPyPyHp-γ-PyHpImPy
110)	5'-W T C A A W-3'	HpPyPyPy-γ-HpHpImPy
111)	5'-W T C A G W-3'	HpPyPyIm-γ-PyHpImPy
112)	5'-W T C A C W-3'	HpPyPyPy-γ-ImHpImPy
113)	5'-W T C G T W-3'	HpPyImHp-γ-PyPyImPy
114)	5'-W T C G A W-3'	HpPyImPy-γ-HpPyImPy
115)	5'-W T C C T W-3'	HpPyPyHp-γ-PyImImPy
116)	5'-W T C C A W-3'	HpPyPyPy-γ-HpImImPy
117)	5'-W T C G G W-3'	HpPyImIm-γ-PyPyImPy
118)	5'-W T C G C W-3'	HpPyImPy-γ-ImPyImPy
119)	5'-W T C C G W-3'	HpPyPyIm-γ-PyImImPy
120)	5'-W T C C C W-3'	HpPyPyPy-γ-ImImImPy

TABLE 8: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WAWNNW-3'

	DNA sequence	aromatic amino acid sequence
121)	5'-W A T T T W-3'	PyHpHpHp-γ-PyPyPyHp
122)	5'-W A T T A W-3'	PyHpHpPy-γ-HpPyPyHp
123)	5'-W A T T G W-3'	PyHpHpIm-γ-PyPyPyHp
124)	5'-W A T T C W-3'	PyHpHpPy-γ-ImPyPyHp
125)	5'-W A T A T W-3'	PyHpPyHp-γ-PyHpPyHp
126)	5'-W A T A A W-3'	PyHpPyPy-γ-HpHpPyHp
127)	5'-W A T A G W-3'	PyHpPyIm-γ-PyHpPyHp
128)	5'-W A T A C W-3'	PyHpPyPy-γ-ImHpPyHp
129)	5'-W A T G T W-3'	PyHpImHp-γ-PyPyPyHp
130)	5'-W A T G A W-3'	PyHpImPy-γ-HpPyPyHp
131)	5'-W A T G G W-3'	PyHpImIm-γ-PyPyPyHp
132)	5'-W A T G C W-3'	PyHpImPy-γ-ImPyPyHp
133)	5'-W A T C T W-3'	PyHpPyHp-γ-PyImPyHp
134)	5'-W A T C A W-3'	PyHpPyPy-γ-HpImPyHp
135)	5'-W A T C G W-3'	PyHpPyIm-γ-PyImPyHp
136)	5'-W A T C C W-3'	PyHpPyPy-γ-ImImPyHp
137)	5'-W A A T T W-3'	PyPyHpHp-γ-PyPyHpHp
138)	5'-W A A T A W-3'	PyPyHpPy-γ-HpPyHpHp
139)	5'-W A A T G W-3'	PyPyHpIm-γ-PyPyHpHp
140)	5'-W A A T C W-3'	PyPyHpPy-γ-ImPyHpHp
141)	5'-W A A A T W-3'	PyPyPyHp-γ-PyHpHpHp
142)	5'-W A A A A W-3'	PyPyPyPy-γ-HpHpHpHp
143)	5'-W A A A G W-3'	PyPyPyIm-γ-PyHpHpHp
144)	5'-W A A A C W-3'	PyPyPyPy-γ-ImHpHpHp
145)	5'-W A A G T W-3'	PyPyImHp-γ-PyPyHpHp
146)	5'-W A A G A W-3'	PyPyImPy-γ-HpPyHpHp
147)	5'-W A A G G W-3'	PyPyImIm-γ-PyPyHpHp
148)	5'-W A A G C W-3'	PyPyImPy-γ-ImPyHpHp
149)	5'-W A A C T W-3'	PyPyPyHp-γ-PyImHpHp
150)	5'-W A A C A W-3'	PyPyPyPy-γ-HpImHpHp
151)	5'-W A A C G W-3'	PyPyPyIm-γ-PyImHpHp
152)	5'-W A A C C W-3'	PyPyPyPy-γ-ImImHpHp

TABLE 9: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WASNNW-3'

	DNA sequence	aromatic amino acid sequence
153)	5'-W A G T T W-3'	PyImHpHp-γ-PyPyPyHp
154)	5'-W A G T A W-3'	PyImHpPy-γ-HpPyPyHp
155)	5'-W A G T G W-3'	PyImHpIm-γ-PyPyPyHp
156)	5'-W A G T C W-3'	PyImHpPy-γ-ImPyPyHp
157)	5'-W A G A T W-3'	PyImPyHp-γ-PyHpPyHp
158)	5'-W A G A A W-3'	PyImPyPy-γ-HpHpPyHp
159)	5'-W A G A G W-3'	PyImPyIm-γ-PyHpPyHp
160)	5'-W A G A C W-3'	PyImPyPy-γ-ImHpPyHp
161)	5'-W A G G T W-3'	PyImImHp-γ-PyPyPyHp
162)	5'-W A G G A W-3'	PyImImPy-γ-HpPyPyHp
163)	5'-W A G C T W-3'	PyImPyHp-γ-PyImPyHp
164)	5'-W A G C A W-3'	PyImPyPy-γ-HpImPyHp
165)	5'-W A G G G W-3'	PyImImIm-γ-PyPyPyHp
166)	5'-W A G G C W-3'	PyImImPy-γ-ImPyPyHp
167)	5'-W A G C G W-3'	PyImPyIm-γ-PyImPyHp
168)	5'-W A G C C W-3'	PyImPyPy-γ-ImImPyHp
169)	5'-W A C T T W-3'	PyPyHpHp-γ-PyPyImHp
170)	5'-W A C T A W-3'	PyPyHpPy-γ-HpPyImHp
171)	5'-W A C T G W-3'	PyPyHpIm-γ-PyPyImHp
172)	5'-W A C T C W-3'	PyPyHpPy-γ-ImPyImHp
173)	5'-W A C A T W-3'	PyPyPyHp-γ-PyHpImHp
174)	5'-W A C A A W-3'	PyPyPyPy-γ-HpHpImHp
175)	5'-W A C A G W-3'	PyPyPyIm-γ-PyHpImHp
176)	5'-W A C A C W-3'	PyPyPyPy-γ-ImHpImHp
177)	5'-W A C G T W-3'	PyPyImHp-γ-PyPyImHp
178)	5'-W A C G A W-3'	PyPyImPy-γ-HpPyImHp
179)	5'-W A C C T W-3'	PyPyPyHp-γ-PyImImHp
180)	5'-W A C C A W-3'	PyPyPyPy-γ-HpImImHp
181)	5'-W A C G G W-3'	PyPyImIm-γ-PyPyImHp
182)	5'-W A C G C W-3'	PyPyImPy-γ-ImPyImHp
183)	5'-W A C C G W-3'	PyPyPyIm-γ-PyImImHp
184)	5'-W A C C C W-3'	PyPyPyPy-γ-ImImImHp

TABLE 10: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WCWNNW-3'

	DNA sequence	aromatic amino acid sequence
185)	5'-W C T T T W-3'	PyHpHpHp-γ-PyPyPyIm
186)	5'-W C T T A W-3'	PyHpHpPy-γ-HpPyPyIm
187)	5'-W C T T G W-3'	PyHpHpIm-γ-PyPyPyIm
188)	5'-W C T T C W-3'	PyHpHpPy-γ-ImPyPyIm
189)	5'-W C T A T W-3'	PyHpPyHp-γ-PyHpPyIm
190)	5'-W C T A A W-3'	PyHpPyPy-γ-HpHpPyIm
191)	5'-W C T A G W-3'	PyHpPyIm-γ-PyHpPyIm
192)	5'-W C T A C W-3'	PyHpPyPy-γ-ImHpPyIm
193)	5'-W C T G T W-3'	PyHpImHp-γ-PyPyPyIm
194)	5'-W C T G A W-3'	PyHpImPy-γ-HpPyPyIm
195)	5'-W C T G G W-3'	PyHpImIm-γ-PyPyPyIm
196)	5'-W C T G C W-3'	PyHpImPy-γ-ImPyPyIm
197)	5'-W C T C T W-3'	PyHpPyHp-γ-PyImPyIm
198)	5'-W C T C A W-3'	PyHpPyPy-γ-HpImPyIm
199)	5'-W C T C G W-3'	PyHpPyIm-γ-PyImPyIm
200)	5'-W C T C C W-3'	PyHpPyPy-γ-ImImPyIm
201)	5'-W C A T T W-3'	PyPyHpHp-γ-PyPyHpIm
202)	5'-W C A T A W-3'	PyPyHpPy-γ-HpPyHpIm
203)	5'-W C A T G W-3'	PyPyHpIm-γ-PyPyHpIm
204)	5'-W C A T C W-3'	PyPyHpPy-γ-ImPyHpIm
205)	5'-W C A A T W-3'	PyPyPyHp-γ-PyHpHpIm
206)	5'-W C A A A W-3'	PyPyPyPy-γ-HpHpHpIm
207)	5'-W C A A G W-3'	PyPyPyIm-γ-PyHpHpIm
208)	5'-W C A A C W-3'	PyPyPyPy-γ-ImHpHpIm
209)	5'-W C A G T W-3'	PyPyImHp-γ-PyPyHpIm
210)	5'-W C A G A W-3'	PyPyImPy-γ-HpPyHpIm
211)	5'-W C A G G W-3'	PyPyImIm-γ-PyPyHpIm
212)	5'-W C A G C W-3'	PyPyImPy-γ-ImPyHpIm
213)	5'-W C A C T W-3'	PyPyPyHp-γ-PyImHpIm
214)	5'-W C A C A W-3'	PyPyPyPy-γ-HpImHpIm
215)	5'-W C A C G W-3'	PyPyPyIm-γ-PyImHpIm
216)	5'-W C A C C W-3'	PyPyPyPy-γ-ImImHpIm

TABLE 11: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WCSNNW-3'

DNA sequence	aromatic amino acid sequence
217) 5'-W C G T T W-3'	PyImHpHp-γ-PyPyPyIm
218) 5'-W C G T A W-3'	PyImHpPy-γ-HpPyPyIm
219) 5'-W C G T G W-3'	PyImHpIm-γ-PyPyPyIm
220) 5'-W C G T C W-3'	PyImHpPy-γ-ImPyPyIm
221) 5'-W C G A T W-3'	PyImPyHp-γ-PyHpPyIm
222) 5'-W C G A A W-3'	PyImPyPy-γ-HpHpPyIm
223) 5'-W C G A G W-3'	PyImPyIm-γ-PyHpPyIm
224) 5'-W C G A C W-3'	PyImPyPy-γ-ImHpPyIm
225) 5'-W C G G T W-3'	PyImImHp-γ-PyPyPyIm
226) 5'-W C G G A W-3'	PyImImPy-γ-HpPyPyIm
227) 5'-W C G C T W-3'	PyImPyHp-γ-PyImPyIm
228) 5'-W C G C A W-3'	PyImPyPy-γ-HpImPyIm
229) 5'-W C C T T W-3'	PyPyHpHp-γ-PyPyImIm
230) 5'-W C C T A W-3'	PyPyHpPy-γ-HpPyImIm
231) 5'-W C C T G W-3'	PyPyHpIm-γ-PyPyImIm
232) 5'-W C C T C W-3'	PyPyHpPy-γ-ImPyImIm
233) 5'-W C C A T W-3'	PyPyPyHp-γ-PyHpImIm
234) 5'-W C C A A W-3'	PyPyPyPy-γ-HpHpImIm
235) 5'-W C C A G W-3'	PyPyPyIm-γ-PyHpImIm
236) 5'-W C C A C W-3'	PyPyPyPy-γ-ImHpImIm
237) 5'-W C C G T W-3'	PyPyImHp-γ-PyPyImIm
238) 5'-W C C G A W-3'	PyPyImPy-γ-HpPyImIm
239) 5'-W C C C T W-3'	PyPyPyHp-γ-PyImImIm
240) 5'-W C C C A W-3'	PyPyPyPy-γ-HpImImIm
G9) 5'-W C G G G W-3'	PyImImIm-γ-PyPyPyIm
G10) 5'-W C G G C W-3'	PyImImPy-γ-ImPyPyIm
G11) 5'-W C G C G W-3'	PyImPyIm-γ-PyImPyIm
G12) 5'-W C G C C W-3'	PyImPyPy-γ-ImImPyIm
G13) 5'-W C C G G W-3'	PyPyImIm-γ-PyPyImIm
G14) 5'-W C C G C W-3'	PyPyImPy-γ-ImPyImIm
G15) 5'-W C C C G W-3'	PyPyPyIm-γ-PyImImIm
G16) 5'-W C C C C W-3'	PyPyPyPy-γ-ImImImIm

TABLE 12: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WGWNNW-3' with β-substitutions included.

	DNA sequence	aromatic amino acid sequence
3β)	5'-W G T T G W-3'	ImHp-β-Im-γ-PyPyPyPy
7β)	5'-W G T A G W-3'	ImHp-β-Im-γ-PyHpPyPy
9β)	5'-W G T G T W-3'	Im-β-ImHp-γ-PyPyPyPy
10β)	5'-W G T G A W-3'	Im-β-ImPy-γ-HpPyPyPy
11β)	5'-W G T G G W-3'	Im-β-ImIm-γ-PyPyPyPy
12β)	5'-W G T G C W-3'	Im-β-ImPy-γ-ImPyPyPy
15β)	5'-W G T C G W-3'	ImHp-β-Im-γ-PyImPyPy
19β)	5'-W G A T G W-3'	ImPy-β-Im-γ-PyPyHpPy
23β)	5'-W G A A G W-3'	ImPy-β-Im-γ-PyHpHpPy
25β)	5'-W G A G T W-3'	Im-β-ImHp-γ-PyPyHpPy
26β)	5'-W G A G A W-3'	Im-β-ImPy-γ-HpPyHpPy
27β)	5'-W G A G G W-3'	Im-β-ImIm-γ-PyPyHpPy
28β)	5'-W G A G C W-3'	Im-β-ImPy-γ-ImPyHpPy
31β)	5'-W G A C G W-3'	ImPy-β-Im-γ-PyImHpPy

TABLE 13: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WGSNNW-3' with β-substitutions included.

	DNA sequence	aromatic amino acid sequence
35β)	5'-W G G T G W-3'	ImIm-β-Im-γ-PyPyPyPy
39β)	5'-W G G A G W-3'	ImIm-β-Im-γ-PyHpPyPy
45β)	5'-W G C T T W-3'	ImPyHpHp-γ-Py-β-ImPy
46β)	5'-W G C T A W-3'	ImPyHpPy-γ-Hp-β-ImPy
47β)	5'-W G C T G W-3'	ImPyHpIm-γ-Py-β-ImPy
47β2)	5'-W G C T G W-3'	ImPy-β-Im-γ-Py-β-ImPy
48β)	5'-W G C T C W-3'	ImPyHpPy-γ-Im-β-ImPy
49β)	5'-W G C A T W-3'	ImPyPyHp-γ-Py-β-ImPy
50β)	5'-W G C A A W-3'	ImPyPyPy-γ-Hp-β-ImPy
51β)	5'-W G C A G W-3'	ImPyPyIm-γ-Py-β-ImPy
51β2)	5'-W G C A G W-3'	ImPy-β-Im-γ-Py-β-ImPy
52β)	5'-W G C A C W-3'	ImPyPyPy-γ-Im-β-ImPy
53β)	5'-W G C G T W-3'	ImPyImHp-γ-Py-β-ImPy
53β2)	5'-W G C G T W-3'	Im-β-ImHp-γ-Py-β-ImPy
54β)	5'-W G C G A W-3'	ImPyImPy-γ-Hp-β-ImPy
54β2)	5'-W G C G A W-3'	Im-β-ImPy-γ-Hp-β-ImPy
G3β)	5'-W G G C G W-3'	ImIm-β-Im-γ-PyImPyPy
G5β)	5'-W G C G G W-3'	ImPyImIm-γ-Py-β-ImPy
G5β2)	5'-W G C G G W-3'	Im-β-ImIm-γ-Py-β-ImPy
G6β)	5'-W G C G C W-3'	ImPyImPy-γ-Im-β-ImPy
G6β2)	5'-W G C G C W-3'	Im-β-ImPy-γ-Im-β-ImPy
G7β)	5'-W G C C G W-3'	ImPy-β-Im-γ-PyImImPy

TABLE 14: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WTWNNW-3' with β-substitutions included.

	DNA sequence	aromatic amino acid sequence
59β)	5'-W T T T G W-3'	HpHp-β-Im-γ-PyPyPyPy
63β)	5'-W T T A G W-3'	HpHp-β-Im-γ-PyHpPyPy
65β)	5'-W T T G T W-3'	Hp-β-ImHp-γ-PyPyPyPy
66β)	5'-W T T G A W-3'	Hp-β-ImPy-γ-HpPyPyPy
67β)	5'-W T T G G W-3'	Hp-β-ImIm-γ-PyPyPyPy
68β)	5'-W T T G C W-3'	Hp-β-ImPy-γ-ImPyPyPy
71β)	5'-W T T C G W-3'	HpHp-β-Im-γ-PyImPyPy
75β)	5'-W T A T G W-3'	HpPy-β-Im-γ-PyPyHpPy
79β)	5'-W T A A G W-3'	HpPy-β-Im-γ-PyHpHpPy
81β)	5'-W T A G T W-3'	Hp-β-ImHp-γ-PyPyHpPy
82β)	5'-W T A G A W-3'	Hp-β-ImPy-γ-HpPyHpPy
83β)	5'-W T A G G W-3'	Hp-β-ImIm-γ-PyPyHpPy
84β)	5'-W T A G C W-3'	Hp-β-ImPy-γ-ImPyHpPy
87β)	5'-W T A C G W-3'	HpPy-β-Im-γ-PyImHpPy

TABLE 15: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WTSNNW-3' with β-substitutions included.

	DNA sequence	aromatic amino acid sequence
91β)	5'-W T G T G W-3'	HpIm-β-Im-γ-PyPyPyPy
95β)	5'-W T G A G W-3'	HpIm-β-Im-γ-PyHpPyPy
103β)	5'-W T G C G W-3'	HpIm-β-Im-γ-PyImPyPy
105β)	5'-W T C T T W-3'	HpPyHpHp-γ-Py-β-ImPy
106β)	5'-W T C T A W-3'	HpPyHpPy-γ-Hp-β-ImPy
107β)	5'-W T C T G W-3'	HpPyHpIm-γ-Py-β-ImPy
107β2)	5'-W T C T G W-3'	HpPy-β-Im-γ-Py-β-ImPy
108β)	5'-W T C T C W-3'	HpPyHpPy-γ-Im-β-ImPy
109β)	5'-W T C A T W-3'	HpPyPyHp-γ-Py-β-ImPy
110β)	5'-W T C A A W-3'	HpPyPyPy-γ-Hp-β-ImPy
111β)	5'-W T C A G W-3'	HpPyPyIm-γ-Py-β-ImPy
111β2)	5'-W T C A G W-3'	HpPy-β-Im-γ-Py-β-ImPy
112β)	5'-W T C A C W-3'	HpPyPyPy-γ-Im-β-ImPy
113β)	5'-W T C G T W-3'	HpPyImHp-γ-Py-β-ImPy
113β2)	5'-W T C G T W-3'	Hp-β-ImHp-γ-Py-β-ImPy
114β)	5'-W T C G A W-3'	HpPyImPy-γ-Hp-β-ImPy
114β2)	5'-W T C G A W-3'	Hp-β-ImPy-γ-Hp-β-ImPy
117β)	5'-W T C G G W-3'	HpPyImIm-γ-Py-β-ImPy
117β2)	5'-W T C G G W-3'	Hp-β-ImIm-γ-Py-β-ImPy
118β)	5'-W T C G C W-3'	HpPyImPy-γ-Im-β-ImPy
118β2)	5'-W T C G C W-3'	Hp-β-ImPy-γ-Im-β-ImPy
119β)	5'-W T C C G W-3'	HpPy-β-Im-γ-PyImImPy

TABLE 16: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WAWNNW-3' with β-substitutions included.

	DNA sequence	aromatic amino acid sequence
123β)	5'-W A T T G W-3'	PyHp-β-Im-γ-PyPyPyHp
127β)	5'-W A T A G W-3'	PyHp-β-Im-γ-PyHpPyHp
129β)	5'-W A T G T W-3'	Py-β-ImHp-γ-PyPyPyHp
130β)	5'-W A T G A W-3'	Py-β-ImPy-γ-HpPyPyHp
131β)	5'-W A T G G W-3'	Py-β-ImIm-γ-PyPyPyHp
132β)	5'-W A T G C W-3'	Py-β-ImPy-γ-ImPyPyHp
135β)	5'-W A T C G W-3'	PyHp-β-Im-γ-PyImPyHp
139β)	5'-W A A T G W-3'	PyPy-β-Im-γ-PyPyHpHp
143β)	5'-W A A A G W-3'	PyPy-β-Im-γ-PyHpHpHp
145β)	5'-W A A G T W-3'	Py-β-ImHp-γ-PyPyHpHp
146β)	5'-W A A G A W-3'	Py-β-ImPy-γ-HpPyHpHp
147β)	5'-W A A G G W-3'	Py-β-ImIm-γ-PyPyHpHp
148β)	5'-W A A G C W-3'	Py-β-ImPy-γ-ImPyHpHp
151β)	5'-W A A C G W-3'	PyPy-β-Im-γ-PyImHpHp

TABLE 17: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WASNNW-3' with β-substitutions included.

	DNA sequence	aromatic amino acid sequence
155β)	5'-W A G T G W-3'	PyIm-β-Im-γ-PyPyPyHp
159β)	5'-W A G A G W-3'	PyIm-β-Im-γ-PyHpPyHp
167β)	5'-W A G C G W-3'	PyIm-β-Im-γ-PyImPyHp
169β)	5'-W A C T T W-3'	PyPyHpHp-γ-Py-β-ImHp
170β)	5'-W A C T A W-3'	PyPyHpPy-γ-Hp-β-ImHp
171β)	5'-W A C T G W-3'	PyPyHpIm-γ-Py-β-ImHp
171β2)	5'-W A C T G W-3'	PyPy-β-Im-γ-Py-β-ImHp
172β)	5'-W A C T C W-3'	PyPyHpPy-γ-Im-β-ImHp
173β)	5'-W A C A T W-3'	PyPyPyHp-γ-Py-β-ImHp
174β)	5'-W A C A A W-3'	PyPyPyPy-γ-Hp-β-ImHp
175β)	5'-W A C A G W-3'	PyPyPyIm-γ-Py-β-ImHp
175β2)	5'-W A C A G W-3'	PyPy-β-Im-γ-Py-β-ImHp
176β)	5'-W A C A C W-3'	PyPyPyPy-γ-Im-β-ImHp
177β)	5'-W A C G T W-3'	PyPyImHp-γ-Py-β-ImHp
177β2)	5'-W A C G T W-3'	Py-β-ImHp-γ-Py-β-ImHp
178β)	5'-W A C G A W-3'	PyPyImPy-γ-Hp-β-ImHp
178β2)	5'-W A C G A W-3'	Py-β-ImPy-γ-Hp-β-ImHp
181β)	5'-W A C G G W-3'	PyPyImIm-γ-Py-β-ImHp
181β2)	5'-W A C G G W-3'	Py-β-ImIm-γ-Py-β-ImHp
182β)	5'-W A C G C W-3'	PyPyImPy-γ-Im-β-ImHp
182β2)	5'-W A C G C W-3'	Py-β-ImPy-γ-Im-β-ImHp
183β2)	5'-W A C C G W-3'	PyPy-β-Im-γ-PyImImHp

TABLE 18: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WCWNNW-3' with β-substitutions included.

	DNA sequence	aromatic amino acid sequence
185β)	5'-W C T T T W-3'	PyHpHpHp-γ-PyPy-β-Im
186β)	5'-W C T T A W-3'	PyHpHpPy-γ-HpPy-β-Im
187β)	5'-W C T T G W-3'	PyHpHpIm-γ-PyPy-β-Im
187β2)	5'-W C T T G W-3'	PyHp-β-Im-γ-PyPy-β-Im
188β)	5'-W C T T C W-3'	PyHpHpPy-γ-ImPy-β-Im
189β)	5'-W C T A T W-3'	PyHpPyHp-γ-PyHp-β-Im
190β)	5'-W C T A A W-3'	PyHpPyPy-γ-HpHp-β-Im
191β)	5'-W C T A G W-3'	PyHpPyIm-γ-PyHp-β-Im
191β2)	5'-W C T A G W-3'	PyHp-β-Im-γ-PyHp-β-Im
192β)	5'-W C T A C W-3'	PyHpPyPy-γ-ImHp-β-Im
193β)	5'-W C T G T W-3'	PyHpImHp-γ-PyPy-β-Im
193β2)	5'-W C T G T W-3'	Py-β-ImHp-γ-PyPy-β-Im
194β)	5'-W C T G A W-3'	PyHpImPy-γ-HpPy-β-Im
194β2)	5'-W C T G A W-3'	Py-β-ImPy-γ-HpPy-β-Im
195β)	5'-W C T G G W-3'	PyHpImIm-γ-PyPy-β-Im
195β2)	5'-W C T G G W-3'	Py-β-ImIm-γ-PyPy-β-Im
196β)	5'-W C T G C W-3'	PyHpImPy-γ-ImPy-β-Im
196β2)	5'-W C T G C W-3'	Py-β-ImPy-γ-ImPy-β-Im
197β)	5'-W C T C T W-3'	PyHpPyHp-γ-PyIm-β-Im
198β)	5'-W C T C A W-3'	PyHpPyPy-γ-HpIm-β-Im
199β)	5'-W C T C G W-3'	PyHpPyIm-γ-PyIm-β-Im
199β2)	5'-W C T C G W-3'	PyHp-β-Im-γ-PyIm-β-Im
200β)	5'-W C T C C W-3'	PyHpPyPy-γ-ImIm-β-Im
201β)	5'-W C A T T W-3'	PyPyHpHp-γ-PyPy-β-Im
202β)	5'-W C A T A W-3'	PyPyHpPy-γ-HpPy-β-Im
203β)	5'-W C A T G W-3'	PyPyHpIm-γ-PyPy-β-Im
203β2)	5'-W C A T G W-3'	PyPy-β-Im-γ-PyPy-β-Im
204β)	5'-W C A T C W-3'	PyPyHpPy-γ-ImPy-β-Im
205β)	5'-W C A A T W-3'	PyPyPyHp-γ-PyHp-β-Im
206β)	5'-W C A A A W-3'	PyPyPyPy-γ-HpHp-β-Im

TABLE 18 (cont): 8-ring Hairpin Polyamides for 6-bp 5'-WCWNNW-3' with β-substitutions included.

	DNA sequence	aromatic amino acid sequence
207β)	5'-W C A A G W-3'	PyPyPyIm-γ-PyHp-β-Im
207β2)	5'-W C A A G W-3'	PyPy-β-Im-γ-PyHp-β-Im
208β)	5'-W C A A C W-3'	PyPyPyPy-γ-ImHp-β-Im
209β)	5'-W C A G T W-3'	PyPyImHp-γ-PyPy-β-Im
209β2)	5'-W C A G T W-3'	Py-β-ImHp-γ-PyPy-β-Im
210β)	5'-W C A G A W-3'	PyPyImPy-γ-HpPy-β-Im
210β2)	5'-W C A G A W-3'	Py-β-ImPy-γ-HpPy-β-Im
211β)	5'-W C A G G W-3'	PyPyImIm-γ-PyPy-β-Im
211β2)	5'-W C A G G W-3'	Py-β-ImIm-γ-PyPy-β-Im
212β)	5'-W C A G C W-3'	PyPyImPy-γ-ImPy-β-Im
212β2)	5'-W C A G C W-3'	Py-β-ImPy-γ-ImPy-β-Im
213β)	5'-W C A C T W-3'	PyPyPyHp-γ-PyIm-β-Im
214β)	5'-W C A C A W-3'	PyPyPyPy-γ-HpIm-β-Im
215β)	5'-W C A C G W-3'	PyPyPyIm-γ-PyIm-β-Im
215β2)	5'-W C A C G W-3'	PyPy-β-Im-γ-PyIm-β-Im
216β)	5'-W C A C C W-3'	PyPyPyPy-γ-ImIm-β-Im

TABLE 19: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WCSNNW-3' with β-substitutions included.

	DNA sequence	aromatic amino acid sequence
217β)	5'-W C G T T W-3'	PyImHpHp-γ-PyPy-β-Im
218β)	5'-W C G T A W-3'	PyImHpPy-γ-HpPy-β-Im
219β)	5'-W C G T G W-3'	PyImHpIm-γ-PyPy-β-Im
219β2)	5'-W C G T G W-3'	PyIm-β-Im-γ-PyPy-β-Im
220β)	5'-W C G T C W-3'	PyImHpPy-γ-ImPy-β-Im
221β)	5'-W C G A T W-3'	PyImPyHp-γ-PyHp-β-Im
222β)	5'-W C G A A W-3'	PyImPyPy-γ-HpHp-β-Im
223β)	5'-W C G A G W-3'	PyImPyIm-γ-PyHp-β-Im
223β2)	5'-W C G A G W-3'	PyIm-β-Im-γ-PyHp-β-Im
224β)	5'-W C G A C W-3'	PyImPyPy-γ-ImHp-β-Im
225β)	5'-W C G G T W-3'	PyImImHp-γ-PyPy-β-Im
226β)	5'-W C G G A W-3'	PyImImPy-γ-HpPy-β-Im
227β)	5'-W C G C T W-3'	PyImPyHp-γ-PyIm-β-Im
228β)	5'-W C G C A W-3'	PyImPyPy-γ-HpIm-β-Im
229β)	5'-W C C T T W-3'	PyPyHpHp-γ-Py-β-ImIm
230β)	5'-W C C T A W-3'	PyPyHpPy-γ-Hp-β-ImIm
231β)	5'-W C C T G W-3'	PyPyHpIm-γ-Py-β-ImIm
231β2)	5'-W C C T G W-3'	PyPy-β-Im-γ-Py-β-ImIm
232β)	5'-W C C T C W-3'	PyPyHpPy-γ-Im-β-ImIm
233β)	5'-W C C A T W-3'	PyPyPyHp-γ-Py-β-ImIm
234β)	5'-W C C A A W-3'	PyPyPyPy-γ-Hp-β-ImIm
235β)	5'-W C C A G W-3'	PyPyPyIm-γ-Py-β-ImIm
235β2)	5'-W C C A G W-3'	PyPy-β-Im-γ-Py-β-ImIm
236β)	5'-W C C A C W-3'	PyPyPyPy-γ-Im-β-ImIm
237β)	5'-W C C G T W-3'	PyPyImHp-γ-Py-β-ImIm
237β2)	5'-W C C G T W-3'	Py-β-ImHp-γ-Py-β-ImIm
238β)	5'-W C C G A W-3'	PyPyImPy-γ-Hp-β-ImIm
238β2)	5'-W C C G A W-3'	Py-β-ImPy-γ-Hp-β-ImIm
G9β)	5'-W C G G G W-3'	PyImImIm-γ-PyPy-β-Im
G10β)	5'-W C G G C W-3'	PyImImPy-γ-ImPy-β-Im

TABLE 19 (cont): 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WCSNNW-3' with β-substitutions included.

DNA sequence	aromatic amino acid sequence
G11β) 5'-W C G C G W-3'	PyImPyIm-γ-PyIm-β-Im
G11β2)5'-W C G C G W-3'	PyIm-β-Im-γ-PyIm-β-Im
G12β) 5'-W C G C C W-3'	PyImPyPy-γ-ImIm-β-Im
G13β) 5'-W C C G G W-3'	PyPyImIm-γ-Py-β-ImIm
G13β2)5'-W C C G G W-3'	Py-β-ImIm-γ-Py-β-ImIm
G14β) 5'-W C C G C W-3'	PyPyImPy-γ-Im-β-ImIm
G14β2)5'-W C C G C W-3'	Py-β-ImPy-γ-Im-β-ImIm
G15β) 5'-W C C C G W-3'	PyPy-β-Im-γ-PyImImIm

If the process described above of designing a preferred polyamide molecule $X_1X_2X_3X_4$-γ-$X_5X_6X_7X_8$ comprising eight aromatic aminoacid residues does not produce a selective polyamide that binds to the target identified DNA sequence with subnanomolar affinity and with a selectivity over mismatch sequences of greater than a factor of ten, a polyamide molecule $X_1X_2X_3X_4X_5$-γ-$X_6X_7X_8X_9X_{10}$ having five carboxamide binding pairs can be designed that is selective for a seven base pair identified target 5'-WNNNNNW-3' sequence. The design and synthesis of the five binding pair polyamide is similar to that of the four binding pair polyamide $X_1X_2X_3X_4$-γ-$X_5X_6X_7X_8$ described above.

The polyamide design process, shown schematically in Figure 7 provides a method for designing a ten carboxamide residue molecule comprising five carboxamide binding pairs for selective detection and binding of a target seven base pair 5'-WNNNNNW-3' sequence in the minor groove of double stranded DNA. The design process identifies an appropriate polyamide ligand for recognition of a predetermined seven base pair, 5'-WNNNNNW-3' sequence with subnanomolar affinity and >10-fold specificity versus mismatch sites. Trauger, J.W., Baird, E. E. Dervan, P.B. describes the recognition of DNA by designed ligands at subnanomolar concentrations. *Nature* **382**, 559-561 (1996).

In order to prepare a polyamide molecule specific for an identified seven base pair sequence of double stranded DNA, a user starts the 10-ring hairpin design process that implements the minor groove recognition pairing code summarized in Table 2 above. In the

design process a 5'-WNNNNNW-3' sequence was identified. In a preferred embodiment, the identified sequence was located within a gene promoter. The identified sequence was then defined as 5'-W***abcde***W-3' in a stepwise process wherein ***a***, ***b***, ***c***, ***d***,and ***e***, were sequentially and independently defined as A, G, C, or T. The structure of the polyamide molecule was then correspondingly defined by sequentially chosing antiparallel carboxamide binding pairs according to the minor groove pairing code summarized in Table 2 above. Thus, if ***a*** was G, then X_1 was defined as Im, and X_{10} was defined as Py. If ***a*** was C, then X_1 was defined as Py, and X_{10} was defined as Im. If ***a*** was T, then X_1 was defined as Hp, and X_{10} was defined as Py. If ***a*** was A, then X_1 was defined as Py, and X_{10} was defined as Hp.

Similarly, ***b*** was defined as A, G, C, or T and corresponding carboxamide binding pairs were defined. According to the same rules, if ***b*** was G, then X_2 was defined as Im, and X_9 was defined as Py. If ***b*** was C, then X_2 was defined as Py, and X_9 was defined as Im. Likewise, if ***b*** was T, then X_2 was defined as Hp, and X_9 was defined as Py. If ***b*** was A, then X_2 was defined as Py, and X_9 was defined as Hp.

The next step was to define ***c*** as A, G, C, or T and then define corresponding carboxamide binding pairs. Following the same rules, if ***c*** was G, then X_3 was defined as Im, and X_8 was defined as Py. If ***c*** was C, then X_3 was defined as Py, and X_8 was defined as Im. Similarly, if ***c*** was T, then X_3 was defined as Hp, and X_8 was defined as Py. If ***c*** was A, then X_3 was defined as Py, and X_8 was defined as Hp. Similarly, ***d*** was defined as A, G, C, or T and the corresponding carboxamide binding pair was defined. According to the above rules, if ***d*** was G, then X_4 was defined as Im, and X_7 was defined as Py. If ***d*** was C, then X_4 was defined as Py, and X_7 was defined as Im. If ***d*** was T, then X_4 was defined as Hp, and X_7 was defined as Py. If ***d*** was A, then X_4 was defined as Py, and X_7 was defined as Hp. Finally, ***e*** was defined as A, G, C, or T and the corresponding carboxamide binding pair was defined. According to the above rules, if ***e*** was G, then X_5 was defined as Im, and X_6 was defined as Py. If ***e*** was C, then X_5 was defined as Py, and X_6 was defined as Im. If ***e*** was T, then X_5 was defined as Hp, and X_6 was defined as Py. If ***e*** was A, then X_5 was defined as Py, and X_6 was defined as Hp.

With all ten carboxamide residues that participate in the binding pairs now defined, the designed polyamide $X_1X_2X_3X_4X_5$-γ-$X_6X_7X_8X_9X_{10}$ suitable for binding to the identified

sequence was synthesized using known techniques. Baird, E. E. & Dervan, P. B. describes the solid phase synthesis of polyamides containing imidazole and pyrrole amino acids. *J. Am. Chem. Soc.* **118**, 6141-6146 (1996); *also see* PCT US 97/003332.

The binding affinity of the synthesized polyamide to the identified sequence was determined using a quantitative DNase footprint titration method for studying protein-DNA interactions described by Brenowitz, M., Senear, D. F., Shea, M. A. & Ackers, G. K., *Methods Enzymol.* **130**, 132-181 (1986). If the affinity of the synthesized polyamide at the target site was not subnanomolar affinity then substituting at least one β-alanine residue for a pyrrole or 3-hydroxypyrrole residue was considered in order to optimize the exact positions of the binding pairs of aromatic amino acids. If the affinity of the polyamide at the target site was subnanomolar affinity then the sequence specificity of the polyamide versus mismatch sequences was determined. If the specificity versus mismatch sites was not > 10-fold specificity then adding a β-alanine (shown schematically in Figure 8) was considered, in order to optimize the positions of the aromatic amino acids in relationship to the base pairs in the minor groove. Specificity of the polyamide molecule for the target identified sequence versus mismatch sequence sites of greater than 10-fold was considered a successful result of design process.

The 1024 polyamide molecules comprising five carboxamide binding pairs that were designed using this method are useful for binding to the 1024 target 5'-NNNNN-3' core sequences, and are listed in Tables 20-51. A corresponding polyamide molecule was designed for each DNA sequence (241-1232) and (G17-G48) using the process outlined above and shown schematically in Figure 7.

If the synthesized polyamide molecule did not bind to the target identified sequence with subnanomolar affinity or if the synthesized polyamide molecule did not exhibit a specificity for the target identified sequence versus mismatch sequence sites of greater than 10-fold, the option of substituting an aliphatic amino acid residue for one of the carboxamide residues was considered. The preferred aliphatic amino acid residue is β-alanine. At least one aliphatic amino acid residue such as a β-alanine residue provided some flexibility to the central portion of the polyamide molecule, acting as a "spring" to permit optimization of the hydrogen bonding between the carboxamide binding pairs and the nucleotide bases of the double stranded DNA.

In general, it was not found to be advantageous to replace either member of the terminal carboxamide binding pair, X_1/X_{10}, with β-alanine. Similarly, β-alanine was not substituted for members of the binding pair, X_5/X_6, adjacent to the γ hairpin residue. β-alanine residues were not substituted for N-methylimidazole residues. The use of β-alanine in place of a pyrrole or 3-hydroxypyrrole amino acid residue provides aromatic/aliphatic pairing (Im/β, β/Im, Hp/β, β/Hp, Py/β, and β/Py) and aliphatic/aliphatic pairing (β/β) substitution.

The method for selecting which pyrrole amino acid to substitute with β-alanine is schematically illustrated in Figure 8. Selective placement of an aliphatic β-alanine (β) residue paired with either a pyrrole (Py), 3-hydroxypyrrole (Hp), or imidazole (Im) aromatic amino acid or another β-alanine residue is found to compensate for sequence composition effects to improve recognition and binding of the minor groove of DNA by pyrrole-imidazole polyamides of the present invention. If an all-ring polyamide has been found to have an affinity which is not subnanomolar, or a specificity versus mismatch sequences which is less than 10-fold it may be caused by DNA sequence-composition effects which can be reduced by replacement of an aromatic amino acid with an aliphatic β-alanine residue. In a polyamide molecule that comprises five binding pairs it is only beneficial to place β-alanine in positions X_2, X_3, X_4, X_7, X_8, and X_9. No more than two β-alanine residues may be placed within a single hairpin structure. No more than a single β-residue may be placed within each individual polyamide subunit, e.g., if X_2 is replaced with β-alanine, X_3 or X_4 cannot be replaced as well.

These rules and others were implemented in the method schematically illustrated in Figure 8. This process is suitable for the refinement of the design polyamide comprising five binding pairs that has been designed by the method illustrated in Figure 7, but which lacks subnanomolar affinity or greater than 10-fold specificity at the identified target DNA sequence. As in the basic design method, the designed polyamides are synthesized and the affinity and specificity of binding to the target DNA were determined.

As discussed above, for a given 10-ring polyamide molecule there are six possible outcomes for the process of substituting a β-alanine residue for an aromatic amino acid residue. First, there may be no position at which it is possible to add a β-alanine residue; in such case, a better binding affinity or selectivity can be sought in the design and synthesis of a polyamide

with four or six carboxamide binding pairs, described below. Second, the process may result in a derivative which contains a single β-alanine substitution (such derivatives are numbered according to the parent numbering scheme such that a single β-derivative of compound 5 would be called 5β), which is sufficient to produce subnanomolar binding affinity and >10-fold specificity, and at which point the process is deemed complete.

Third, the process of Figure 8 may result in a polyamide which contains a single β-alanine substitution which is not sufficient to produce subnanomolar binding affinity and >10-fold specificity, but where there are no additional positions in which it is possible to substitute a β-alanine residue, and in such a case a paired β-alanine residue should be added as described in Figure 9 and text below. Fourth, the process of Figure 7 may result in a polyamide that contains a single β-alanine substitution that is not sufficient to produce subnanomolar binding affinity and >10-fold specificity, but where there is an additional position for β-alanine substitution that does produce a polyamide with the criterion level of affinity and selectivity. Tables 52-83 list polyamide compounds 241β-1232β and G17β -G48β, corresponding to DNA sequences 241-1232 and G17 – G48, that contain one or two β-alanine residues.

A fifth possibility is that substitution at a second position by the method illustrated in Figure 9 with a paired β-alanine residue is not sufficient to produce a polyamide having the subnanomolar binding affinity and >10-fold specificity, and a polyamide with four or six carboxamide binding pairs, should be designed and synthesized, as described below. Finally, the design process may result in a polyamide that has a paired β-alanine substitution that is sufficient to produce subnanomolar binding affinity and >10-fold specificity, and therefore the design process is deemed complete. Tables 52-83 list polyamide compounds 241β-1232β and G17β -G48β, corresponding to DNA sequences 241-1232 and G17 – G48, that contain one or two β-alanine residues. In addition, Tables 52-83 list polyamides corresponding to sequences (241-1232) and (G17-G48) labeled (241βp-1232βp) and (G17βp-G48βp) that contain paired β/β residues added by the process described in Figure 9.

TABLE 20: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGGWNNW-3'

	DNA sequence	aromatic amino acid sequence
241)	5'-W G G T T T W-3'	ImImHpHpHp-γ-PyPyPyPyPy
242)	5'-W G G T T A W-3'	ImImHpHpPy-γ-HpPyPyPyPy
243)	5'-W G G T T G W-3'	ImImHpHpIm-γ-PyPyPyPyPy
244)	5'-W G G T T C W-3'	ImImHpHpPy-γ-ImPyPyPyPy
245)	5'-W G G T A T W-3'	ImImHpPyHp-γ-PyHpPyPyPy
246)	5'-W G G T A A W-3'	ImImHpPyPy-γ-HpHpPyPyPy
247)	5'-W G G T A G W-3'	ImImHpPyIm-γ-PyHpPyPyPy
248)	5'-W G G T A C W-3'	ImImHpPyPy-γ-ImHpPyPyPy
249)	5'-W G G T G T W-3'	ImImHpImHp-γ-PyPyPyPyPy
250)	5'-W G G T G A W-3'	ImImHpImPy-γ-HpPyPyPyPy
251)	5'-W G G T G G W-3'	ImImHpImIm-γ-PyPyPyPyPy
252)	5'-W G G T G C W-3'	ImImHpImPy-γ-ImPyPyPyPy
253)	5'-W G G T C T W-3'	ImImHpPyHp-γ-PyImPyPyPy
254)	5'-W G G T C A W-3'	ImImHpPyPy-γ-HpImPyPyPy
255)	5'-W G G T C G W-3'	ImImHpPyIm-γ-PyImPyPyPy
256)	5'-W G G T C C W-3'	ImImHpPyPy-γ-ImImPyPyPy
257)	5'-W G G A T T W-3'	ImImPyHpHp-γ-PyPyHpPyPy
258)	5'-W G G A T A W-3'	ImImPyHpPy-γ-HpPyHpPyPy
259)	5'-W G G A T G W-3'	ImImPyHpIm-γ-PyPyHpPyPy
260)	5'-W G G A T C W-3'	ImImPyHpPy-γ-ImPyHpPyPy
261)	5'-W G G A A T W-3'	ImImPyPyHp-γ-PyHpHpPyPy
262)	5'-W G G A A A W-3'	ImImPyPyPy-γ-HpHpHpPyPy
263)	5'-W G G A A G W-3'	ImImPyPyIm-γ-PyHpHpPyPy
264)	5'-W G G A A C W-3'	ImImPyPyPy-γ-ImHpHpPyPy
265)	5'-W G G A G T W-3'	ImImPyImHp-γ-PyPyHpPyPy
266)	5'-W G G A G A W-3'	ImImPyImPy-γ-HpPyHpPyPy
267)	5'-W G G A G G W-3'	ImImPyImIm-γ-PyPyHpPyPy
268)	5'-W G G A G C W-3'	ImImPyImPy-γ-ImPyHpPyPy
269)	5'-W G G A C T W-3'	ImImPyPyHp-γ-PyImHpPyPy
270)	5'-W G G A C A W-3'	ImImPyPyPy-γ-HpImHpPyPy
271)	5'-W G G A C G W-3'	ImImPyPyIm-γ-PyImHpPyPy
272)	5'-W G G A C C W-3'	ImImPyPyPy-γ-ImImHpPyPy

TABLE 21: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGGSNNW-3'

	DNA sequence	aromatic amino acid sequence
273)	5'-W G G G T T W-3'	ImImImHpHp-γ-PyPyPyPyPy
274)	5'-W G G G T A W-3'	ImImImHpPy-γ-HpPyPyPyPy
275)	5'-W G G G T G W-3'	ImImImHpIm-γ-PyPyPyPyPy
276)	5'-W G G G T C W-3'	ImImImHpPy-γ-ImPyPyPyPy
277)	5'-W G G G A T W-3'	ImImImPyHp-γ-PyHpPyPyPy
278)	5'-W G G G A A W-3'	ImImImPyPy-γ-HpHpPyPyPy
279)	5'-W G G G A G W-3'	ImImImPyIm-γ-PyHpPyPyPy
280)	5'-W G G G A C W-3'	ImImImPyPy-γ-ImHpPyPyPy
281)	5'-W G G G G T W-3'	ImImImImHp-γ-PyPyPyPyPy
282)	5'-W G G G G A W-3'	ImImImImPy-γ-HpPyPyPyPy
283)	5'-W G G G C T W-3'	ImImImPyHp-γ-PyImPyPyPy
284)	5'-W G G G C A W-3'	ImImImPyPy-γ-HpImPyPyPy
285)	5'-W G G C T T W-3'	ImImPyHpHp-γ-PyPyImPyPy
286)	5'-W G G C T A W-3'	ImImPyHpPy-γ-HpPyImPyPy
287)	5'-W G G C T G W-3'	ImImPyHpIm-γ-PyPyImPyPy
288)	5'-W G G C T C W-3'	ImImPyHpPy-γ-ImPyImPyPy
289)	5'-W G G C A T W-3'	ImImPyPyHp-γ-PyHpImPyPy
290)	5'-W G G C A A W-3'	ImImPyPyPy-γ-HpHpImPyPy
291)	5'-W G G C A G W-3'	ImImPyPyIm-γ-PyHpImPyPy
292)	5'-W G G C A C W-3'	ImImPyPyPy-γ-ImHpImPyPy
293)	5'-W G G C G T W-3'	ImImPyImHp-γ-PyPyImPyPy
294)	5'-W G G C G A W-3'	ImImPyImPy-γ-HpPyImPyPy
295)	5'-W G G C C T W-3'	ImImPyPyHp-γ-PyImImPyPy
296)	5'-W G G C C A W-3'	ImImPyPyPy-γ-HpImImPyPy
G17)	5'-W G G G G G W-3'	ImImImImIm-γ-PyPyPyPyPy
G18)	5'-W G G G G C W-3'	ImImImImPy-γ-ImPyPyPyPy
G19)	5'-W G G G C G W-3'	ImImImPyIm-γ-PyImPyPyPy
G20)	5'-W G G G C C W-3'	ImImImPyPy-γ-ImImPyPyPy
G21)	5'-W G G C G G W-3'	ImImPyImIm-γ-PyPyImPyPy
G22)	5'-W G G C G C W-3'	ImImPyImPy-γ-ImPyImPyPy
G23)	5'-W G G C C G W-3'	ImImPyPyIm-γ-PyImImPyPy
G24)	5'-W G G C C C W-3'	ImImPyPyPy-γ-ImImImPyPy

TABLE 22: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGTWNNW-3'

	DNA sequence	aromatic amino acid sequence
297)	5'-W G T T T T W-3'	ImHpHpHpHp-γ-PyPyPyPyPy
298)	5'-W G T T T A W-3'	ImHpHpHpPy-γ-HpPyPyPyPy
299)	5'-W G T T T G W-3'	ImHpHpHpIm-γ-PyPyPyPyPy
300)	5'-W G T T T C W-3'	ImHpHpHpPy-γ-ImPyPyPyPy
301)	5'-W G T T A T W-3'	ImHpHpPyHp-γ-PyHpPyPyPy
302)	5'-W G T T A A W-3'	ImHpHpPyPy-γ-HpHpPyPyPy
303)	5'-W G T T A G W-3'	ImHpHpPyIm-γ-PyHpPyPyPy
304)	5'-W G T T A C W-3'	ImHpHpPyPy-γ-ImHpPyPyPy
305)	5'-W G T T G T W-3'	ImHpHpImHp-γ-PyPyPyPyPy
306)	5'-W G T T G A W-3'	ImHpHpImPy-γ-HpPyPyPyPy
307)	5'-W G T T G G W-3'	ImHpHpImIm-γ-PyPyPyPyPy
308)	5'-W G T T G C W-3'	ImHpHpImPy-γ-ImPyPyPyPy
309)	5'-W G T T C T W-3'	ImHpHpPyHp-γ-PyImPyPyPy
310)	5'-W G T T C A W-3'	ImHpHpPyPy-γ-HpImPyPyPy
311)	5'-W G T T C G W-3'	ImHpHpPyIm-γ-PyImPyPyPy
312)	5'-W G T T C C W-3'	ImHpHpPyPy-γ-ImImPyPyPy
313)	5'-W G T A T T W-3'	ImHpPyHpHp-γ-PyPyHpPyPy
314)	5'-W G T A T A W-3'	ImHpPyHpPy-γ-HpPyHpPyPy
315)	5'-W G T A T G W-3'	ImHpPyHpIm-γ-PyPyHpPyPy
316)	5'-W G T A T C W-3'	ImHpPyHpPy-γ-ImPyHpPyPy
317)	5'-W G T A A T W-3'	ImHpPyPyHp-γ-PyHpHpPyPy
318)	5'-W G T A A A W-3'	ImHpPyPyPy-γ-HpHpHpPyPy
319)	5'-W G T A A G W-3'	ImHpPyPyIm-γ-PyHpHpPyPy
320)	5'-W G T A A C W-3'	ImHpPyPyPy-γ-ImHpHpPyPy
321)	5'-W G T A G T W-3'	ImHpPyImHp-γ-PyPyHpPyPy
322)	5'-W G T A G A W-3'	ImHpPyImPy-γ-HpPyHpPyPy
323)	5'-W G T A G G W-3'	ImHpPyImIm-γ-PyPyHpPyPy
324)	5'-W G T A G C W-3'	ImHpPyImPy-γ-ImPyHpPyPy
325)	5'-W G T A C T W-3'	ImHpPyPyHp-γ-PyImHpPyPy
326)	5'-W G T A C A W-3'	ImHpPyPyPy-γ-HpImHpPyPy
327)	5'-W G T A C G W-3'	ImHpPyPyIm-γ-PyImHpPyPy
328)	5'-W G T A C C W-3'	ImHpPyPyPy-γ-ImImHpPyPy

TABLE 23: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGTSNNW-3'

	DNA sequence	aromatic amino acid sequence
329)	5'-W G T G T T W-3'	ImHpImHpHp-γ-PyPyPyPyPy
330)	5'-W G T G T A W-3'	ImHpImHpPy-γ-HpPyPyPyPy
331)	5'-W G T G T G W-3'	ImHpImHpIm-γ-PyPyPyPyPy
332)	5'-W G T G T C W-3'	ImHpImHpPy-γ-ImPyPyPyPy
333)	5'-W G T G A T W-3'	ImHpImPyHp-γ-PyHpPyPyPy
334)	5'-W G T G A A W-3'	ImHpImPyPy-γ-HpHpPyPyPy
335)	5'-W G T G A G W-3'	ImHpImPyIm-γ-PyHpPyPyPy
336)	5'-W G T G A C W-3'	ImHpImPyPy-γ-ImHpPyPyPy
337)	5'-W G T G G T W-3'	ImHpImImHp-γ-PyPyPyPyPy
338)	5'-W G T G G A W-3'	ImHpImImPy-γ-HpPyPyPyPy
339)	5'-W G T G C T W-3'	ImHpImPyHp-γ-PyImPyPyPy
340)	5'-W G T G C A W-3'	ImHpImPyPy-γ-HpImPyPyPy
341)	5'-W G T G G G W-3'	ImHpImImIm-γ-PyPyPyPyPy
342)	5'-W G T G G C W-3'	ImHpImImPy-γ-ImPyPyPyPy
343)	5'-W G T G C G W-3'	ImHpImPyIm-γ-PyImPyPyPy
344)	5'-W G T G C C W-3'	ImHpImPyPy-γ-ImImPyPyPy
345)	5'-W G T C T T W-3'	ImHpPyHpHp-γ-PyPyImPyPy
346)	5'-W G T C T A W-3'	ImHpPyHpPy-γ-HpPyImPyPy
347)	5'-W G T C T G W-3'	ImHpPyHpIm-γ-PyPyImPyPy
348)	5'-W G T C T C W-3'	ImHpPyHpPy-γ-ImPyImPyPy
349)	5'-W G T C A T W-3'	ImHpPyPyHp-γ-PyHpImPyPy
350)	5'-W G T C A A W-3'	ImHpPyPyPy-γ-HpHpImPyPy
351)	5'-W G T C A G W-3'	ImHpPyPyIm-γ-PyHpImPyPy
352)	5'-W G T C A C W-3'	ImHpPyPyPy-γ-ImHpImPyPy
353)	5'-W G T C G T W-3'	ImHpPyImHp-γ-PyPyImPyPy
354)	5'-W G T C G A W-3'	ImHpPyImPy-γ-HpPyImPyPy
355)	5'-W G T C C T W-3'	ImHpPyPyHp-γ-PyImImPyPy
356)	5'-W G T C C A W-3'	ImHpPyPyPy-γ-HpImImPyPy
357)	5'-W G T C G G W-3'	ImHpPyImIm-γ-PyPyImPyPy
358)	5'-W G T C G C W-3'	ImHpPyImPy-γ-ImPyImPyPy
359)	5'-W G T C C G W-3'	ImHpPyPyIm-γ-PyImImPyPy
360)	5'-W G T C C C W-3'	ImHpPyPyPy-γ-ImImImPyPy

TABLE 24: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGAWNNW-3'

	DNA sequence	aromatic amino acid sequence
361)	5'-W G A T T T W-3'	ImPyHpHpHp-γ-PyPyPyHpPy
362)	5'-W G A T T A W-3'	ImPyHpHpPy-γ-HpPyPyHpPy
363)	5'-W G A T T G W-3'	ImPyHpHpIm-γ-PyPyPyHpPy
364)	5'-W G A T T C W-3'	ImPyHpHpPy-γ-ImPyPyHpPy
365)	5'-W G A T A T W-3'	ImPyHpPyHp-γ-PyHpPyHpPy
366)	5'-W G A T A A W-3'	ImPyHpPyPy-γ-HpHpPyHpPy
367)	5'-W G A T A G W-3'	ImPyHpPyIm-γ-PyHpPyHpPy
368)	5'-W G A T A C W-3'	ImPyHpPyPy-γ-ImHpPyHpPy
369)	5'-W G A T G T W-3'	ImPyHpImHp-γ-PyPyPyHpPy
370)	5'-W G A T G A W-3'	ImPyHpImPy-γ-HpPyPyHpPy
371)	5'-W G A T G G W-3'	ImPyHpImIm-γ-PyPyPyHpPy
372)	5'-W G A T G C W-3'	ImPyHpImPy-γ-ImPyPyHpPy
373)	5'-W G A T C T W-3'	ImPyHpPyHp-γ-PyImPyHpPy
374)	5'-W G A T C A W-3'	ImPyHpPyPy-γ-HpImPyHpPy
375)	5'-W G A T C G W-3'	ImPyHpPyIm-γ-PyImPyHpPy
376)	5'-W G A T C C W-3'	ImPyHpPyPy-γ-ImImPyHpPy
377)	5'-W G A A T T W-3'	ImPyPyHpHp-γ-PyPyHpHpPy
378)	5'-W G A A T A W-3'	ImPyPyHpPy-γ-HpPyHpHpPy
379)	5'-W G A A T G W-3'	ImPyPyHpIm-γ-PyPyHpHpPy
380)	5'-W G A A T C W-3'	ImPyPyHpPy-γ-ImPyHpHpPy
381)	5'-W G A A A T W-3'	ImPyPyPyHp-γ-PyHpHpHpPy
382)	5'-W G A A A A W-3'	ImPyPyPyPy-γ-HpHpHpHpPy
383)	5'-W G A A A G W-3'	ImPyPyPyIm-γ-PyHpHpHpPy
384)	5'-W G A A A C W-3'	ImPyPyPyPy-γ-ImHpHpHpPy
385)	5'-W G A A G T W-3'	ImPyPyImHp-γ-PyPyHpHpPy
386)	5'-W G A A G A W-3'	ImPyPyImPy-γ-HpPyHpHpPy
387)	5'-W G A A G G W-3'	ImPyPyImIm-γ-PyPyHpHpPy
388)	5'-W G A A G C W-3'	ImPyPyImPy-γ-ImPyHpHpPy
389)	5'-W G A A C T W-3'	ImPyPyPyHp-γ-PyImHpHpPy
390)	5'-W G A A C A W-3'	ImPyPyPyPy-γ-HpImHpHpPy
391)	5'-W G A A C G W-3'	ImPyPyPyIm-γ-PyImHpHpPy
392)	5'-W G A A C C W-3'	ImPyPyPyPy-γ-ImImHpHpPy

TABLE 25: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGASNNW-3'

	DNA sequence	aromatic amino acid sequence
393)	5'-W G A G T T W-3'	ImPyImHpHp-γ-PyPyPyHpPy
394)	5'-W G A G T A W-3'	ImPyImHpPy-γ-HpPyPyHpPy
395)	5'-W G A G T G W-3'	ImPyImHpIm-γ-PyPyPyHpPy
396)	5'-W G A G T C W-3'	ImPyImHpPy-γ-ImPyPyHpPy
397)	5'-W G A G A T W-3'	ImPyImPyHp-γ-PyHpPyHpPy
398)	5'-W G A G A A W-3'	ImPyImPyPy-γ-HpHpPyHpPy
399)	5'-W G A G A G W-3'	ImPyImPyIm-γ-PyHpPyHpPy
400)	5'-W G A G A C W-3'	ImPyImPyPy-γ-ImHpPyHpPy
401)	5'-W G A G G T W-3'	ImPyImImHp-γ-PyPyPyHpPy
402)	5'-W G A G G A W-3'	ImPyImImPy-γ-HpPyPyHpPy
403)	5'-W G A G C T W-3'	ImPyImPyHp-γ-PyImPyHpPy
404)	5'-W G A G C A W-3'	ImPyImPyPy-γ-HpImPyHpPy
405)	5'-W G A G G G W-3'	ImPyImImIm-γ-PyPyPyHpPy
406)	5'-W G A G G C W-3'	ImPyImImPy-γ-ImPyPyHpPy
407)	5'-W G A G C G W-3'	ImPyImPyIm-γ-PyImPyHpPy
408)	5'-W G A G C C W-3'	ImPyImPyPy-γ-ImImPyHpPy
409)	5'-W G A C T T W-3'	ImPyPyHpHp-γ-PyPyImHpPy
410)	5'-W G A C T A W-3'	ImPyPyHpPy-γ-HpPyImHpPy
411)	5'-W G A C T G W-3'	ImPyPyHpIm-γ-PyPyImHpPy
412)	5'-W G A C T C W-3'	ImPyPyHpPy-γ-ImPyImHpPy
413)	5'-W G A C A T W-3'	ImPyPyPyHp-γ-PyHpImHpPy
414)	5'-W G A C A A W-3'	ImPyPyPyPy-γ-HpHpImHpPy
415)	5'-W G A C A G W-3'	ImPyPyPyIm-γ-PyHpImHpPy
416)	5'-W G A C A C W-3'	ImPyPyPyPy-γ-ImHpImHpPy
417)	5'-W G A C G T W-3'	ImPyPyImHp-γ-PyPyImHpPy
418)	5'-W G A C G A W-3'	ImPyPyImPy-γ-HpPyImHpPy
419)	5'-W G A C C T W-3'	ImPyPyPyHp-γ-PyImImHpPy
420)	5'-W G A C C A W-3'	ImPyPyPyPy-γ-HpImImHpPy
421)	5'-W G A C G G W-3'	ImPyPyImIm-γ-PyPyImHpPy
422)	5'-W G A C G C W-3'	ImPyPyImPy-γ-ImPyImHpPy
423)	5'-W G A C C G W-3'	ImPyPyPyIm-γ-PyImImHpPy
424)	5'-W G A C C C W-3'	ImPyPyPyPy-γ-ImImImHpPy

TABLE 26: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCWNNW-3'

	DNA sequence	aromatic amino acid sequence
425)	5'-W G C T T T W-3'	ImPyHpHpHp-γ-PyPyPyImPy
426)	5'-W G C T T A W-3'	ImPyHpHpPy-γ-HpPyPyImPy
427)	5'-W G C T T G W-3'	ImPyHpHpIm-γ-PyPyPyImPy
428)	5'-W G C T T C W-3'	ImPyHpHpPy-γ-ImPyPyImPy
429)	5'-W G C T A T W-3'	ImPyHpPyHp-γ-PyHpPyImPy
430)	5'-W G C T A A W-3'	ImPyHpPyPy-γ-HpHpPyImPy
431)	5'-W G C T A G W-3'	ImPyHpPyIm-γ-PyHpPyImPy
432)	5'-W G C T A C W-3'	ImPyHpPyPy-γ-ImHpPyImPy
433)	5'-W G C T G T W-3'	ImPyHpImHp-γ-PyPyPyImPy
434)	5'-W G C T G A W-3'	ImPyHpImPy-γ-HpPyPyImPy
435)	5'-W G C T G G W-3'	ImPyHpImIm-γ-PyPyPyImPy
436)	5'-W G C T G C W-3'	ImPyHpImPy-γ-ImPyPyImPy
437)	5'-W G C T C T W-3'	ImPyHpPyHp-γ-PyImPyImPy
438)	5'-W G C T C A W-3'	ImPyHpPyPy-γ-HpImPyImPy
439)	5'-W G C T C G W-3'	ImPyHpPyIm-γ-PyImPyImPy
440)	5'-W G C T C C W-3'	ImPyHpPyPy-γ-ImImPyImPy
441)	5'-W G C A T T W-3'	ImPyPyHpHp-γ-PyPyHpImPy
442)	5'-W G C A T A W-3'	ImPyPyHpPy-γ-HpPyHpImPy
443)	5'-W G C A T G W-3'	ImPyPyHpIm-γ-PyPyHpImPy
444)	5'-W G C A T C W-3'	ImPyPyHpPy-γ-ImPyHpImPy
445)	5'-W G C A A T W-3'	ImPyPyPyHp-γ-PyHpHpImPy
446)	5'-W G C A A A W-3'	ImPyPyPyPy-γ-HpHpHpImPy
447)	5'-W G C A A G W-3'	ImPyPyPyIm-γ-PyHpHpImPy
448)	5'-W G C A A C W-3'	ImPyPyPyPy-γ-ImHpHpImPy
449)	5'-W G C A G T W-3'	ImPyPyImHp-γ-PyPyHpImPy
450)	5'-W G C A G A W-3'	ImPyPyImPy-γ-HpPyHpImPy
451)	5'-W G C A G G W-3'	ImPyPyImIm-γ-PyPyHpImPy
452)	5'-W G C A G C W-3'	ImPyPyImPy-γ-ImPyHpImPy
453)	5'-W G C A C T W-3'	ImPyPyPyHp-γ-PyImHpImPy
454)	5'-W G C A C A W-3'	ImPyPyPyPy-γ-HpImHpImPy
455)	5'-W G C A C G W-3'	ImPyPyPyIm-γ-PyImHpImPy
456)	5'-W G C A C C W-3'	ImPyPyPyPy-γ-ImImHpImPy

TABLE 27: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCSNNW-3'

	DNA sequence	aromatic amino acid sequence
457)	5'-W G C G T T W-3'	ImPyImHpHp-γ-PyPyPyImPy
458)	5'-W G C G T A W-3'	ImPyImHpPy-γ-HpPyPyImPy
459)	5'-W G C G T G W-3'	ImPyImHpIm-γ-PyPyPyImPy
460)	5'-W G C G T C W-3'	ImPyImHpPy-γ-ImPyPyImPy
461)	5'-W G C G A T W-3'	ImPyImPyHp-γ-PyHpPyImPy
462)	5'-W G C G A A W-3'	ImPyImPyPy-γ-HpHpPyImPy
463)	5'-W G C G A G W-3'	ImPyImPyIm-γ-PyHpPyImPy
464)	5'-W G C G A C W-3'	ImPyImPyPy-γ-ImHpPyImPy
465)	5'-W G C G G T W-3'	ImPyImImHp-γ-PyPyPyImPy
466)	5'-W G C G G A W-3'	ImPyImImPy-γ-HpPyPyImPy
467)	5'-W G C G C T W-3'	ImPyImPyHp-γ-PyImPyImPy
468)	5'-W G C G C A W-3'	ImPyImPyPy-γ-HpImPyImPy
469)	5'-W G C C T T W-3'	ImPyPyHpHp-γ-PyPyImImPy
470)	5'-W G C C T A W-3'	ImPyPyHpPy-γ-HpPyImImPy
471)	5'-W G C C T G W-3'	ImPyPyHpIm-γ-PyPyImImPy
472)	5'-W G C C T C W-3'	ImPyPyHpPy-γ-ImPyImImPy
473)	5'-W G C C A T W-3'	ImPyPyPyHp-γ-PyHpImImPy
474)	5'-W G C C A A W-3'	ImPyPyPyPy-γ-HpHpImImPy
475)	5'-W G C C A G W-3'	ImPyPyPyIm-γ-PyHpImImPy
476)	5'-W G C C A C W-3'	ImPyPyPyPy-γ-ImHpImImPy
477)	5'-W G C C G T W-3'	ImPyPyImHp-γ-PyPyImImPy
478)	5'-W G C C G A W-3'	ImPyPyImPy-γ-HpPyImImPy
479)	5'-W G C C C T W-3'	ImPyPyPyHp-γ-PyImImImPy
480)	5'-W G C C C A W-3'	ImPyPyPyPy-γ-HpImImImPy
G25)	5'-W G C G G G W-3'	ImPyImImIm-γ-PyPyPyImPy
G26)	5'-W G C G G C W-3'	ImPyImImPy-γ-ImPyPyImPy
G27)	5'-W G C G C G W-3'	ImPyImPyIm-γ-PyImPyImPy
G28)	5'-W G C G C C W-3'	ImPyImPyPy-γ-ImImPyImPy
G29)	5'-W G C C G G W-3'	ImPyPyImIm-γ-PyPyImImPy
G30)	5'-W G C C G C W-3'	ImPyPyImPy-γ-ImPyImImPy
G31)	5'-W G C C C G W-3'	ImPyPyPyIm-γ-PyImImImPy
G32)	5'-W G C C C C W-3'	ImPyPyPyPy-γ-ImImImImPy

TABLE 28: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGWNNW-3'

	DNA sequence	aromatic amino acid sequence
481)	5'-W C G T T T W-3'	PyImHpHpHp-γ-PyPyPyPyIm
482)	5'-W C G T T A W-3'	PyImHpHpPy-γ-HpPyPyPyIm
483)	5'-W C G T T G W-3'	PyImHpHpIm-γ-PyPyPyPyIm
484)	5'-W C G T T C W-3'	PyImHpHpPy-γ-ImPyPyPyIm
485)	5'-W C G T A T W-3'	PyImHpPyHp-γ-PyHpPyPyIm
486)	5'-W C G T A A W-3'	PyImHpPyPy-γ-HpHpPyPyIm
487)	5'-W C G T A G W-3'	PyImHpPyIm-γ-PyHpPyPyIm
488)	5'-W C G T A C W-3'	PyImHpPyPy-γ-ImHpPyPyIm
489)	5'-W C G T G T W-3'	PyImHpImHp-γ-PyPyPyPyIm
490)	5'-W C G T G A W-3'	PyImHpImPy-γ-HpPyPyPyIm
491)	5'-W C G T G G W-3'	PyImHpImIm-γ-PyPyPyPyIm
492)	5'-W C G T G C W-3'	PyImHpImPy-γ-ImPyPyPyIm
493)	5'-W C G T C T W-3'	PyImHpPyHp-γ-PyImPyPyIm
494)	5'-W C G T C A W-3'	PyImHpPyPy-γ-HpImPyPyIm
495)	5'-W C G T C G W-3'	PyImHpPyIm-γ-PyImPyPyIm
496)	5'-W C G T C C W-3'	PyImHpPyPy-γ-ImImPyPyIm
497)	5'-W C G A T T W-3'	PyImPyHpHp-γ-PyPyHpPyIm
498)	5'-W C G A T A W-3'	PyImPyHpPy-γ-HpPyHpPyIm
499)	5'-W C G A T G W-3'	PyImPyHpIm-γ-PyPyHpPyIm
500)	5'-W C G A T C W-3'	PyImPyHpPy-γ-ImPyHpPyIm
501)	5'-W C G A A T W-3'	PyImPyPyHp-γ-PyHpHpPyIm
502)	5'-W C G A A A W-3'	PyImPyPyPy-γ-HpHpHpPyIm
503)	5'-W C G A A G W-3'	PyImPyPyIm-γ-PyHpHpPyIm
504)	5'-W C G A A C W-3'	PyImPyPyPy-γ-ImHpHpPyIm
505)	5'-W C G A G T W-3'	PyImPyImHp-γ-PyPyHpPyIm
506)	5'-W C G A G A W-3'	PyImPyImPy-γ-HpPyHpPyIm
507)	5'-W C G A G G W-3'	PyImPyImIm-γ-PyPyHpPyIm
508)	5'-W C G A G C W-3'	PyImPyImPy-γ-ImPyHpPyIm
509)	5'-W C G A C T W-3'	PyImPyPyHp-γ-PyImHpPyIm
510)	5'-W C G A C A W-3'	PyImPyPyPy-γ-HpImHpPyIm
511)	5'-W C G A C G W-3'	PyImPyPyIm-γ-PyImHpPyIm
512)	5'-W C G A C C W-3'	PyImPyPyPy-γ-ImImHpPyIm

TABLE 29: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGSNNW-3'

	DNA sequence	aromatic amino acid sequence
513)	5'-W C G G T T W-3'	PyImImHpHp-γ-PyPyPyPyIm
514)	5'-W C G G T A W-3'	PyImImHpPy-γ-HpPyPyPyIm
515)	5'-W C G G T G W-3'	PyImImHpIm-γ-PyPyPyPyIm
516)	5'-W C G G T C W-3'	PyImImHpPy-γ-ImPyPyPyIm
517)	5'-W C G G A T W-3'	PyImImPyHp-γ-PyHpPyPyIm
518)	5'-W C G G A A W-3'	PyImImPyPy-γ-HpHpPyPyIm
519)	5'-W C G G A G W-3'	PyImImPyIm-γ-PyHpPyPyIm
520)	5'-W C G G A C W-3'	PyImImPyPy-γ-ImHpPyPyIm
521)	5'-W C G G G T W-3'	PyImImImHp-γ-PyPyPyPyIm
522)	5'-W C G G G A W-3'	PyImImImPy-γ-HpPyPyPyIm
523)	5'-W C G G C T W-3'	PyImImPyHp-γ-PyImPyPyIm
524)	5'-W C G G C A W-3'	PyImImPyPy-γ-HpImPyPyIm
525)	5'-W C G C T T W-3'	PyImPyHpHp-γ-PyPyImPyIm
526)	5'-W C G C T A W-3'	PyImPyHpPy-γ-HpPyImPyIm
527)	5'-W C G C T G W-3'	PyImPyHpIm-γ-PyPyImPyIm
528)	5'-W C G C T C W-3'	PyImPyHpPy-γ-ImPyImPyIm
529)	5'-W C G C A T W-3'	PyImPyPyHp-γ-PyHpImPyIm
530)	5'-W C G C A A W-3'	PyImPyPyPy-γ-HpHpImPyIm
531)	5'-W C G C A G W-3'	PyImPyPyIm-γ-PyHpImPyIm
532)	5'-W C G C A C W-3'	PyImPyPyPy-γ-ImHpImPyIm
533)	5'-W C G C G T W-3'	PyImPyImHp-γ-PyPyImPyIm
534)	5'-W C G C G A W-3'	PyImPyImPy-γ-HpPyImPyIm
535)	5'-W C G C C T W-3'	PyImPyPyHp-γ-PyImImPyIm
536)	5'-W C G C C A W-3'	PyImPyPyPy-γ-HpImImPyIm
G33)	5'-W C G G G G W-3'	PyImImImIm-γ-PyPyPyPyIm
G34)	5'-W C G G G C W-3'	PyImImImPy-γ-ImPyPyPyIm
G35)	5'-W C G G C G W-3'	PyImImPyIm-γ-PyImPyPyIm
G36)	5'-W C G G C C W-3'	PyImImPyPy-γ-ImImPyPyIm
G37)	5'-W C G C G G W-3'	PyImPyImIm-γ-PyPyImPyIm
G38)	5'-W C G C G C W-3'	PyImPyImPy-γ-ImPyImPyIm
G39)	5'-W C G C C G W-3'	PyImPyPyIm-γ-PyImImPyIm
G40)	5'-W C G C C C W-3'	PyImPyPyPy-γ-ImImImPyIm

TABLE 30: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTWNNW-3'

	DNA sequence	aromatic amino acid sequence
537)	5'-W C T T T T W-3'	PyHpHpHpHp-γ-PyPyPyPyIm
538)	5'-W C T T T A W-3'	PyHpHpHpPy-γ-HpPyPyPyIm
539)	5'-W C T T T G W-3'	PyHpHpHpIm-γ-PyPyPyPyIm
540)	5'-W C T T T C W-3'	PyHpHpHpPy-γ-ImPyPyPyIm
541)	5'-W C T T A T W-3'	PyHpHpPyHp-γ-PyHpPyPyIm
542)	5'-W C T T A A W-3'	PyHpHpPyPy-γ-HpHpPyPyIm
543)	5'-W C T T A G W-3'	PyHpHpPyIm-γ-PyHpPyPyIm
544)	5'-W C T T A C W-3'	PyHpHpPyPy-γ-ImHpPyPyIm
545)	5'-W C T T G T W-3'	PyHpHpImHp-γ-PyPyPyPyIm
546)	5'-W C T T G A W-3'	PyHpHpImPy-γ-HpPyPyPyIm
547)	5'-W C T T G G W-3'	PyHpHpImIm-γ-PyPyPyPyIm
548)	5'-W C T T G C W-3'	PyHpHpImPy-γ-ImPyPyPyIm
549)	5'-W C T T C T W-3'	PyHpHpPyHp-γ-PyImPyPyIm
550)	5'-W C T T C A W-3'	PyHpHpPyPy-γ-HpImPyPyIm
551)	5'-W C T T C G W-3'	PyHpHpPyIm-γ-PyImPyPyIm
552)	5'-W C T T C C W-3'	PyHpHpPyPy-γ-ImImPyPyIm
553)	5'-W C T A T T W-3'	PyHpPyHpHp-γ-PyPyHpPyIm
554)	5'-W C T A T A W-3'	PyHpPyHpPy-γ-HpPyHpPyIm
555)	5'-W C T A T G W-3'	PyHpPyHpIm-γ-PyPyHpPyIm
556)	5'-W C T A T C W-3'	PyHpPyHpPy-γ-ImPyHpPyIm
557)	5'-W C T A A T W-3'	PyHpPyPyHp-γ-PyHpHpPyIm
558)	5'-W C T A A A W-3'	PyHpPyPyPy-γ-HpHpHpPyIm
559)	5'-W C T A A G W-3'	PyHpPyPyIm-γ-PyHpHpPyIm
560)	5'-W C T A A C W-3'	PyHpPyPyPy-γ-ImHpHpPyIm
561)	5'-W C T A G T W-3'	PyHpPyImHp-γ-PyPyHpPyIm
562)	5'-W C T A G A W-3'	PyHpPyImPy-γ-HpPyHpPyIm
563)	5'-W C T A G G W-3'	PyHpPyImIm-γ-PyPyHpPyIm
564)	5'-W C T A G C W-3'	PyHpPyImPy-γ-ImPyHpPyIm
565)	5'-W C T A C T W-3'	PyHpPyPyHp-γ-PyImHpPyIm
566)	5'-W C T A C A W-3'	PyHpPyPyPy-γ-HpImHpPyIm
567)	5'-W C T A C G W-3'	PyHpPyPyIm-γ-PyImHpPyIm
568)	5'-W C T A C C W-3'	PyHpPyPyPy-γ-ImImHpPyIm

TABLE 31: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTSNNW-3'

	DNA sequence	aromatic amino acid sequence
569)	5'-W C T G T T W-3'	PyHpImHpHp-γ-PyPyPyPyIm
570)	5'-W C T G T A W-3'	PyHpImHpPy-γ-HpPyPyPyIm
571)	5'-W C T G T G W-3'	PyHpImHpIm-γ-PyPyPyPyIm
572)	5'-W C T G T C W-3'	PyHpImHpPy-γ-ImPyPyPyIm
573)	5'-W C T G A T W-3'	PyHpImPyHp-γ-PyHpPyPyIm
574)	5'-W C T G A A W-3'	PyHpImPyPy-γ-HpHpPyPyIm
575)	5'-W C T G A G W-3'	PyHpImPyIm-γ-PyHpPyPyIm
576)	5'-W C T G A C W-3'	PyHpImPyPy-γ-ImHpPyPyIm
577)	5'-W C T G G T W-3'	PyHpImImHp-γ-PyPyPyPyIm
578)	5'-W C T G G A W-3'	PyHpImImPy-γ-HpPyPyPyIm
579)	5'-W C T G C T W-3'	PyHpImPyHp-γ-PyImPyPyIm
580)	5'-W C T G C A W-3'	PyHpImPyPy-γ-HpImPyPyIm
581)	5'-W C T G G G W-3'	PyHpImImIm-γ-PyPyPyPyIm
582)	5'-W C T G G C W-3'	PyHpImImPy-γ-ImPyPyPyIm
583)	5'-W C T G C G W-3'	PyHpImPyIm-γ-PyImPyPyIm
584)	5'-W C T G C C W-3'	PyHpImPyPy-γ-ImImPyPyIm
585)	5'-W C T C T T W-3'	PyHpPyHpHp-γ-PyPyImPyIm
586)	5'-W C T C T A W-3'	PyHpPyHpPy-γ-HpPyImPyIm
587)	5'-W C T C T G W-3'	PyHpPyHpIm-γ-PyPyImPyIm
588)	5'-W C T C T C W-3'	PyHpPyHpPy-γ-ImPyImPyIm
589)	5'-W C T C A T W-3'	PyHpPyPyHp-γ-PyHpImPyIm
590)	5'-W C T C A A W-3'	PyHpPyPyPy-γ-HpHpImPyIm
591)	5'-W C T C A G W-3'	PyHpPyPyIm-γ-PyHpImPyIm
592)	5'-W C T C A C W-3'	PyHpPyPyPy-γ-ImHpImPyIm
593)	5'-W C T C G T W-3'	PyHpPyImHp-γ-PyPyImPyIm
594)	5'-W C T C G A W-3'	PyHpPyImPy-γ-HpPyImPyIm
595)	5'-W C T C C T W-3'	PyHpPyPyHp-γ-PyImImPyIm
596)	5'-W C T C C A W-3'	PyHpPyPyPy-γ-HpImImPyIm
597)	5'-W C T C G G W-3'	PyHpPyImIm-γ-PyPyImPyIm
598)	5'-W C T C G C W-3'	PyHpPyImPy-γ-ImPyImPyIm
599)	5'-W C T C C G W-3'	PyHpPyPyIm-γ-PyImImPyIm
600)	5'-W C T C C C W-3'	PyHpPyPyPy-γ-ImImImPyIm

TABLE 32: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCAWNNW-3'

	DNA sequence	aromatic amino acid sequence
601)	5'-W C A T T T W-3'	PyPyHpHpHp-γ-PyPyPyHpIm
602)	5'-W C A T T A W-3'	PyPyHpHpPy-γ-HpPyPyHpIm
603)	5'-W C A T T G W-3'	PyPyHpHpIm-γ-PyPyPyHpIm
604)	5'-W C A T T C W-3'	PyPyHpHpPy-γ-ImPyPyHpIm
605)	5'-W C A T A T W-3'	PyPyHpPyHp-γ-PyHpPyHpIm
606)	5'-W C A T A A W-3'	PyPyHpPyPy-γ-HpHpPyHpIm
607)	5'-W C A T A G W-3'	PyPyHpPyIm-γ-PyHpPyHpIm
608)	5'-W C A T A C W-3'	PyPyHpPyPy-γ-ImHpPyHpIm
609)	5'-W C A T G T W-3'	PyPyHpImHp-γ-PyPyPyHpIm
610)	5'-W C A T G A W-3'	PyPyHpImPy-γ-HpPyPyHpIm
611)	5'-W C A T G G W-3'	PyPyHpImIm-γ-PyPyPyHpIm
612)	5'-W C A T G C W-3'	PyPyHpImPy-γ-ImPyPyHpIm
613)	5'-W C A T C T W-3'	PyPyHpPyHp-γ-PyImPyHpIm
614)	5'-W C A T C A W-3'	PyPyHpPyPy-γ-HpImPyHpIm
615)	5'-W C A T C G W-3'	PyPyHpPyIm-γ-PyImPyHpIm
616)	5'-W C A T C C W-3'	PyPyHpPyPy-γ-ImImPyHpIm
617)	5'-W C A A T T W-3'	PyPyPyHpHp-γ-PyPyHpHpIm
618)	5'-W C A A T A W-3'	PyPyPyHpPy-γ-HpPyHpHpIm
619)	5'-W C A A T G W-3'	PyPyPyHpIm-γ-PyPyHpHpIm
620)	5'-W C A A T C W-3'	PyPyPyHpPy-γ-ImPyHpHpIm
621)	5'-W C A A A T W-3'	PyPyPyPyHp-γ-PyHpHpHpIm
622)	5'-W C A A A A W-3'	PyPyPyPyPy-γ-HpHpHpHpIm
623)	5'-W C A A A G W-3'	PyPyPyPyIm-γ-PyHpHpHpIm
624)	5'-W C A A A C W-3'	PyPyPyPyPy-γ-ImHpHpHpIm
625)	5'-W C A A G T W-3'	PyPyPyImHp-γ-PyPyHpHpIm
626)	5'-W C A A G A W-3'	PyPyPyImPy-γ-HpPyHpHpIm
627)	5'-W C A A G G W-3'	PyPyPyImIm-γ-PyPyHpHpIm
628)	5'-W C A A G C W-3'	PyPyPyImPy-γ-ImPyHpHpIm
629)	5'-W C A A C T W-3'	PyPyPyPyHp-γ-PyImHpHpIm
630)	5'-W C A A C A W-3'	PyPyPyPyPy-γ-HpImHpHpIm
631)	5'-W C A A C G W-3'	PyPyPyPyIm-γ-PyImHpHpIm
632)	5'-W C A A C C W-3'	PyPyPyPyPy-γ-ImImHpHpIm

TABLE 33: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCASNNW-3'

	DNA sequence	aromatic amino acid sequence
633)	5'-W C A G T T W-3'	PyPyImHpHp-γ-PyPyPyHpIm
634)	5'-W C A G T A W-3'	PyPyImHpPy-γ-HpPyPyHpIm
635)	5'-W C A G T G W-3'	PyPyImHpIm-γ-PyPyPyHpIm
636)	5'-W C A G T C W-3'	PyPyImHpPy-γ-ImPyPyHpIm
637)	5'-W C A G A T W-3'	PyPyImPyHp-γ-PyHpPyHpIm
638)	5'-W C A G A A W-3'	PyPyImPyPy-γ-HpHpPyHpIm
639)	5'-W C A G A G W-3'	PyPyImPyIm-γ-PyHpPyHpIm
640)	5'-W C A G A C W-3'	PyPyImPyPy-γ-ImHpPyHpIm
641)	5'-W C A G G T W-3'	PyPyImImHp-γ-PyPyPyHpIm
642)	5'-W C A G G A W-3'	PyPyImImPy-γ-HpPyPyHpIm
643)	5'-W C A G C T W-3'	PyPyImPyHp-γ-PyImPyHpIm
644)	5'-W C A G C A W-3'	PyPyImPyPy-γ-HpImPyHpIm
645)	5'-W C A G G G W-3'	PyPyImImIm-γ-PyPyPyHpIm
646)	5'-W C A G G C W-3'	PyPyImImPy-γ-ImPyPyHpIm
647)	5'-W C A G C G W-3'	PyPyImPyIm-γ-PyImPyHpIm
648)	5'-W C A G C C W-3'	PyPyImPyPy-γ-ImImPyHpIm
649)	5'-W C A C T T W-3'	PyPyPyHpHp-γ-PyPyImHpIm
650)	5'-W C A C T A W-3'	PyPyPyHpPy-γ-HpPyImHpIm
651)	5'-W C A C T G W-3'	PyPyPyHpIm-γ-PyPyImHpIm
652)	5'-W C A C T C W-3'	PyPyPyHpPy-γ-ImPyImHpIm
653)	5'-W C A C A T W-3'	PyPyPyPyHp-γ-PyHpImHpIm
654)	5'-W C A C A A W-3'	PyPyPyPyPy-γ-HpHpImHpIm
655)	5'-W C A C A G W-3'	PyPyPyPyIm-γ-PyHpImHpIm
656)	5'-W C A C A C W-3'	PyPyPyPyPy-γ-ImHpImHpIm
657)	5'-W C A C G T W-3'	PyPyPyImHp-γ-PyPyImHpIm
658)	5'-W C A C G A W-3'	PyPyPyImPy-γ-HpPyImHpIm
659)	5'-W C A C C T W-3'	PyPyPyPyHp-γ-PyImImHpIm
660)	5'-W C A C C A W-3'	PyPyPyPyPy-γ-HpImImHpIm
661)	5'-W C A C G G W-3'	PyPyPyImIm-γ-PyPyImHpIm
662)	5'-W C A C G C W-3'	PyPyPyImPy-γ-ImPyImHpIm
663)	5'-W C A C C G W-3'	PyPyPyPyIm-γ-PyImImHpIm
664)	5'-W C A C C C W-3'	PyPyPyPyPy-γ-ImImImHpIm

TABLE 34: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCWNNW-3'

	DNA sequence	aromatic amino acid sequence
665)	5'-W C C T T T W-3'	PyPyHpHpHp-γ-PyPyPyImIm
666)	5'-W C C T T A W-3'	PyPyHpHpPy-γ-HpPyPyImIm
667)	5'-W C C T T G W-3'	PyPyHpHpIm-γ-PyPyPyImIm
668)	5'-W C C T T C W-3'	PyPyHpHpPy-γ-ImPyPyImIm
669)	5'-W C C T A T W-3'	PyPyHpPyHp-γ-PyHpPyImIm
670)	5'-W C C T A A W-3'	PyPyHpPyPy-γ-HpHpPyImIm
671)	5'-W C C T A G W-3'	PyPyHpPyIm-γ-PyHpPyImIm
672)	5'-W C C T A C W-3'	PyPyHpPyPy-γ-ImHpPyImIm
673)	5'-W C C T G T W-3'	PyPyHpImHp-γ-PyPyPyImIm
674)	5'-W C C T G A W-3'	PyPyHpImPy-γ-HpPyPyImIm
675)	5'-W C C T G G W-3'	PyPyHpImIm-γ-PyPyPyImIm
676)	5'-W C C T G C W-3'	PyPyHpImPy-γ-ImPyPyImIm
677)	5'-W C C T C T W-3'	PyPyHpPyHp-γ-PyImPyImIm
678)	5'-W C C T C A W-3'	PyPyHpPyPy-γ-HpImPyImIm
679)	5'-W C C T C G W-3'	PyPyHpPyIm-γ-PyImPyImIm
680)	5'-W C C T C C W-3'	PyPyHpPyPy-γ-ImImPyImIm
681)	5'-W C C A T T W-3'	PyPyPyHpHp-γ-PyPyHpImIm
682)	5'-W C C A T A W-3'	PyPyPyHpPy-γ-HpPyHpImIm
683)	5'-W C C A T G W-3'	PyPyPyHpIm-γ-PyPyHpImIm
684)	5'-W C C A T C W-3'	PyPyPyHpPy-γ-ImPyHpImIm
685)	5'-W C C A A T W-3'	PyPyPyPyHp-γ-PyHpHpImIm
686)	5'-W C C A A A W-3'	PyPyPyPyPy-γ-HpHpHpImIm
687)	5'-W C C A A G W-3'	PyPyPyPyIm-γ-PyHpHpImIm
688)	5'-W C C A A C W-3'	PyPyPyPyPy-γ-ImHpHpImIm
689)	5'-W C C A G T W-3'	PyPyPyImHp-γ-PyPyHpImIm
690)	5'-W C C A G A W-3'	PyPyPyImPy-γ-HpPyHpImIm
691)	5'-W C C A G G W-3'	PyPyPyImIm-γ-PyPyHpImIm
692)	5'-W C C A G C W-3'	PyPyPyImPy-γ-ImPyHpImIm
693)	5'-W C C A C T W-3'	PyPyPyPyHp-γ-PyImHpImIm
694)	5'-W C C A C A W-3'	PyPyPyPyPy-γ-HpImHpImIm
695)	5'-W C C A C G W-3'	PyPyPyPyIm-γ-PyImHpImIm
696)	5'-W C C A C C W-3'	PyPyPyPyPy-γ-ImImHpImIm

TABLE 35: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCSNNW-3'

	DNA sequence	aromatic amino acid sequence
697)	5'-W C C G T T W-3'	PyPyImHpHp-γ-PyPyPyImIm
698)	5'-W C C G T A W-3'	PyPyImHpPy-γ-HpPyPyImIm
699)	5'-W C C G T G W-3'	PyPyImHpIm-γ-PyPyPyImIm
700)	5'-W C C G T C W-3'	PyPyImHpPy-γ-ImPyPyImIm
701)	5'-W C C G A T W-3'	PyPyImPyHp-γ-PyHpPyImIm
702)	5'-W C C G A A W-3'	PyPyImPyPy-γ-HpHpPyImIm
703)	5'-W C C G A G W-3'	PyPyImPyIm-γ-PyHpPyImIm
704)	5'-W C C G A C W-3'	PyPyImPyPy-γ-ImHpPyImIm
705)	5'-W C C G G T W-3'	PyPyImImHp-γ-PyPyPyImIm
706)	5'-W C C G G A W-3'	PyPyImImPy-γ-HpPyPyImIm
707)	5'-W C C G C T W-3'	PyPyImPyHp-γ-PyImPyImIm
708)	5'-W C C G C A W-3'	PyPyImPyPy-γ-HpImPyImIm
709)	5'-W C C C T T W-3'	PyPyPyHpHp-γ-PyPyImImIm
710)	5'-W C C C T A W-3'	PyPyPyHpPy-γ-HpPyImImIm
711)	5'-W C C C T G W-3'	PyPyPyHpIm-γ-PyPyImImIm
712)	5'-W C C C T C W-3'	PyPyPyHpPy-γ-ImPyImImIm
713)	5'-W C C C A T W-3'	PyPyPyPyHp-γ-PyHpImImIm
714)	5'-W C C C A A W-3'	PyPyPyPyPy-γ-HpHpImImIm
715)	5'-W C C C A G W-3'	PyPyPyPyIm-γ-PyHpImImIm
716)	5'-W C C C A C W-3'	PyPyPyPyPy-γ-ImHpImImIm
717)	5'-W C C C G T W-3'	PyPyPyImHp-γ-PyPyImImIm
718)	5'-W C C C G A W-3'	PyPyPyImPy-γ-HpPyImImIm
719)	5'-W C C C C T W-3'	PyPyPyPyHp-γ-PyImImImIm
720)	5'-W C C C C A W-3'	PyPyPyPyPy-γ-HpImImImIm
G41)	5'-W C C G G G W-3'	PyPyImImIm-γ-PyPyPyImIm
G42)	5'-W C C G G C W-3'	PyPyImImPy-γ-ImPyPyImIm
G43)	5'-W C C G C G W-3'	PyPyImPyIm-γ-PyImPyImIm
G44)	5'-W C C G C C W-3'	PyPyImPyPy-γ-ImImPyImIm
G45)	5'-W C C C G G W-3'	PyPyPyImIm-γ-PyPyImImIm
G46)	5'-W C C C G C W-3'	PyPyPyImPy-γ-ImPyImImIm
G47)	5'-W C C C C G W-3'	PyPyPyPyIm-γ-PyImImImIm
G48)	5'-W C C C C C W-3'	PyPyPyPyPy-γ-ImImImImIm

TABLE 36: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAGWNNW-3'

	DNA sequence	aromatic amino acid sequence
721)	5'-W A G T T T W-3'	PyImHpHpHp-γ-PyPyPyPyHp
722)	5'-W A G T T A W-3'	PyImHpHpPy-γ-HpPyPyPyHp
723)	5'-W A G T T G W-3'	PyImHpHpIm-γ-PyPyPyPyHp
724)	5'-W A G T T C W-3'	PyImHpHpPy-γ-ImPyPyPyHp
725)	5'-W A G T A T W-3'	PyImHpPyHp-γ-PyHpPyPyHp
726)	5'-W A G T A A W-3'	PyImHpPyPy-γ-HpHpPyPyHp
727)	5'-W A G T A G W-3'	PyImHpPyIm-γ-PyHpPyPyHp
728)	5'-W A G T A C W-3'	PyImHpPyPy-γ-ImHpPyPyHp
729)	5'-W A G T G T W-3'	PyImHpImHp-γ-PyPyPyPyHp
730)	5'-W A G T G A W-3'	PyImHpImPy-γ-HpPyPyPyHp
731)	5'-W A G T G G W-3'	PyImHpImIm-γ-PyPyPyPyHp
732)	5'-W A G T G C W-3'	PyImHpImPy-γ-ImPyPyPyHp
733)	5'-W A G T C T W-3'	PyImHpPyHp-γ-PyImPyPyHp
734)	5'-W A G T C A W-3'	PyImHpPyPy-γ-HpImPyPyHp
735)	5'-W A G T C G W-3'	PyImHpPyIm-γ-PyImPyPyHp
736)	5'-W A G T C C W-3'	PyImHpPyPy-γ-ImImPyPyHp
737)	5'-W A G A T T W-3'	PyImPyHpHp-γ-PyPyHpPyHp
738)	5'-W A G A T A W-3'	PyImPyHpPy-γ-HpPyHpPyHp
739)	5'-W A G A T G W-3'	PyImPyHpIm-γ-PyPyHpPyHp
740)	5'-W A G A T C W-3'	PyImPyHpPy-γ-ImPyHpPyHp
741)	5'-W A G A A T W-3'	PyImPyPyHp-γ-PyHpHpPyHp
742)	5'-W A G A A A W-3'	PyImPyPyPy-γ-HpHpHpPyHp
743)	5'-W A G A A G W-3'	PyImPyPyIm-γ-PyHpHpPyHp
744)	5'-W A G A A C W-3'	PyImPyPyPy-γ-ImHpHpPyHp
745)	5'-W A G A G T W-3'	PyImPyImHp-γ-PyPyHpPyHp
746)	5'-W A G A G A W-3'	PyImPyImPy-γ-HpPyHpPyHp
747)	5'-W A G A G G W-3'	PyImPyImIm-γ-PyPyHpPyHp
748)	5'-W A G A G C W-3'	PyImPyImPy-γ-ImPyHpPyHp
749)	5'-W A G A C T W-3'	PyImPyPyHp-γ-PyImHpPyHp
750)	5'-W A G A C A W-3'	PyImPyPyPy-γ-HpImHpPyHp
751)	5'-W A G A C G W-3'	PyImPyPyIm-γ-PyImHpPyHp
752)	5'-W A G A C C W-3'	PyImPyPyPy-γ-ImImHpPyHp

TABLE 37: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAGSNNW-3'

	DNA sequence	aromatic amino acid sequence
753)	5'-W A G G T T W-3'	PyImImHpHp-γ-PyPyPyPyHp
754)	5'-W A G G T A W-3'	PyImImHpPy-γ-HpPyPyPyHp
755)	5'-W A G G T G W-3'	PyImImHpIm-γ-PyPyPyPyHp
756)	5'-W A G G T C W-3'	PyImImHpPy-γ-ImPyPyPyHp
757)	5'-W A G G A T W-3'	PyImImPyHp-γ-PyHpPyPyHp
758)	5'-W A G G A A W-3'	PyImImPyPy-γ-HpHpPyPyHp
759)	5'-W A G G A G W-3'	PyImImPyIm-γ-PyHpPyPyHp
760)	5'-W A G G A C W-3'	PyImImPyPy-γ-ImHpPyPyHp
761)	5'-W A G G G T W-3'	PyImImImHp-γ-PyPyPyPyHp
762)	5'-W A G G G A W-3'	PyImImImPy-γ-HpPyPyPyHp
763)	5'-W A G G C T W-3'	PyImImPyHp-γ-PyImPyPyHp
764)	5'-W A G G C A W-3'	PyImImPyPy-γ-HpImPyPyHp
765)	5'-W A G C T T W-3'	PyImPyHpHp-γ-PyPyImPyHp
766)	5'-W A G C T A W-3'	PyImPyHpPy-γ-HpPyImPyHp
767)	5'-W A G C T G W-3'	PyImPyHpIm-γ-PyPyImPyHp
768)	5'-W A G C T C W-3'	PyImPyHpPy-γ-ImPyImPyHp
769)	5'-W A G C A T W-3'	PyImPyPyHp-γ-PyHpImPyHp
770)	5'-W A G C A A W-3'	PyImPyPyPy-γ-HpHpImPyHp
771)	5'-W A G C A G W-3'	PyImPyPyIm-γ-PyHpImPyHp
772)	5'-W A G C A C W-3'	PyImPyPyPy-γ-ImHpImPyHp
773)	5'-W A G C G T W-3'	PyImPyImHp-γ-PyPyImPyHp
774)	5'-W A G C G A W-3'	PyImPyImPy-γ-HpPyImPyHp
775)	5'-W A G C C T W-3'	PyImPyPyHp-γ-PyImImPyHp
776)	5'-W A G C C A W-3'	PyImPyPyPy-γ-HpImImPyHp
777)	5'-W A G G G G W-3'	PyImImImIm-γ-PyPyPyPyHp
778)	5'-W A G G G C W-3'	PyImImImPy-γ-ImPyPyPyHp
779)	5'-W A G G C G W-3'	PyImImPyIm-γ-PyImPyPyHp
780)	5'-W A G G C C W-3'	PyImImPyPy-γ-ImImPyPyHp
781)	5'-W A G C G G W-3'	PyImPyImIm-γ-PyPyImPyHp
782)	5'-W A G C G C W-3'	PyImPyImPy-γ-ImPyImPyHp
783)	5'-W A G C C G W-3'	PyImPyPyIm-γ-PyImImPyHp
784)	5'-W A G C C C W-3'	PyImPyPyPy-γ-ImImImPyHp

TABLE 38: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WATWNNW-3'

	DNA sequence	aromatic amino acid sequence
785)	5'-W A T T T T W-3'	PyHpHpHpHp-γ-PyPyPyPyHp
786)	5'-W A T T T A W-3'	PyHpHpHpPy-γ-HpPyPyPyHp
787)	5'-W A T T T G W-3'	PyHpHpHpIm-γ-PyPyPyPyHp
788)	5'-W A T T T C W-3'	PyHpHpHpPy-γ-ImPyPyPyHp
789)	5'-W A T T A T W-3'	PyHpHpPyHp-γ-PyHpPyPyHp
790)	5'-W A T T A A W-3'	PyHpHpPyPy-γ-HpHpPyPyHp
791)	5'-W A T T A G W-3'	PyHpHpPyIm-γ-PyHpPyPyHp
792)	5'-W A T T A C W-3'	PyHpHpPyPy-γ-ImHpPyPyHp
793)	5'-W A T T G T W-3'	PyHpHpImHp-γ-PyPyPyPyHp
794)	5'-W A T T G A W-3'	PyHpHpImPy-γ-HpPyPyPyHp
795)	5'-W A T T G G W-3'	PyHpHpImIm-γ-PyPyPyPyHp
796)	5'-W A T T G C W-3'	PyHpHpImPy-γ-ImPyPyPyHp
797)	5'-W A T T C T W-3'	PyHpHpPyHp-γ-PyImPyPyHp
798)	5'-W A T T C A W-3'	PyHpHpPyPy-γ-HpImPyPyHp
799)	5'-W A T T C G W-3'	PyHpHpPyIm-γ-PyImPyPyHp
800)	5'-W A T T C C W-3'	PyHpHpPyPy-γ-ImImPyPyHp
801)	5'-W A T A T T W-3'	PyHpPyHpHp-γ-PyPyHpPyHp
802)	5'-W A T A T A W-3'	PyHpPyHpPy-γ-HpPyHpPyHp
803)	5'-W A T A T G W-3'	PyHpPyHpIm-γ-PyPyHpPyHp
804)	5'-W A T A T C W-3'	PyHpPyHpPy-γ-ImPyHpPyHp
805)	5'-W A T A A T W-3'	PyHpPyPyHp-γ-PyHpHpPyHp
806)	5'-W A T A A A W-3'	PyHpPyPyPy-γ-HpHpHpPyHp
807)	5'-W A T A A G W-3'	PyHpPyPyIm-γ-PyHpHpPyHp
808)	5'-W A T A A C W-3'	PyHpPyPyPy-γ-ImHpHpPyHp
809)	5'-W A T A G T W-3'	PyHpPyImHp-γ-PyPyHpPyHp
810)	5'-W A T A G A W-3'	PyHpPyImPy-γ-HpPyHpPyHp
811)	5'-W A T A G G W-3'	PyHpPyImIm-γ-PyPyHpPyHp
812)	5'-W A T A G C W-3'	PyHpPyImPy-γ-ImPyHpPyHp
813)	5'-W A T A C T W-3'	PyHpPyPyHp-γ-PyImHpPyHp
814)	5'-W A T A C A W-3'	PyHpPyPyPy-γ-HpImHpPyHp
815)	5'-W A T A C G W-3'	PyHpPyPyIm-γ-PyImHpPyHp
816)	5'-W A T A C C W-3'	PyHpPyPyPy-γ-ImImHpPyHp

TABLE 39: 10-ring Hairpin Polyamides for recognition of 7-bp 5`-WATSNNW-3`

	DNA sequence	aromatic amino acid sequence
817)	5′-W A T G T T W-3′	PyHpImHpHp-γ-PyPyPyPyHp
818)	5′-W A T G T A W-3′	PyHpImHpPy-γ-HpPyPyPyHp
819)	5′-W A T G T G W-3′	PyHpImHpIm-γ-PyPyPyPyHp
820)	5′-W A T G T C W-3′	PyHpImHpPy-γ-ImPyPyPyHp
821)	5′-W A T G A T W-3′	PyHpImPyHp-γ-PyHpPyPyHp
822)	5′-W A T G A A W-3′	PyHpImPyPy-γ-HpHpPyPyHp
823)	5′-W A T G A G W-3′	PyHpImPyIm-γ-PyHpPyPyHp
824)	5′-W A T G A C W-3′	PyHpImPyPy-γ-ImHpPyPyHp
825)	5′-W A T G G T W-3′	PyHpImImHp-γ-PyPyPyPyHp
826)	5′-W A T G G A W-3′	PyHpImImPy-γ-HpPyPyPyHp
827)	5′-W A T G C T W-3′	PyHpImPyHp-γ-PyImPyPyHp
828)	5′-W A T G C A W-3′	PyHpImPyPy-γ-HpImPyPyHp
829)	5′-W A T G G G W-3′	PyHpImImIm-γ-PyPyPyPyHp
830)	5′-W A T G G C W-3′	PyHpImImPy-γ-ImPyPyPyHp
831)	5′-W A T G C G W-3′	PyHpImPyIm-γ-PyImPyPyHp
832)	5′-W A T G C C W-3′	PyHpImPyPy-γ-ImImPyPyHp
833)	5′-W A T C T T W-3′	PyHpPyHpHp-γ-PyPyImPyHp
834)	5′-W A T C T A W-3′	PyHpPyHpPy-γ-HpPyImPyHp
835)	5′-W A T C T G W-3′	PyHpPyHpIm-γ-PyPyImPyHp
836)	5′-W A T C T C W-3′	PyHpPyHpPy-γ-ImPyImPyHp
837)	5′-W A T C A T W-3′	PyHpPyPyHp-γ-PyHpImPyHp
838)	5′-W A T C A A W-3′	PyHpPyPyPy-γ-HpHpImPyHp
839)	5′-W A T C A G W-3′	PyHpPyPyIm-γ-PyHpImPyHp
840)	5′-W A T C A C W-3′	PyHpPyPyPy-γ-ImHpImPyHp
841)	5′-W A T C G T W-3′	PyHpPyImHp-γ-PyPyImPyHp
842)	5′-W A T C G A W-3′	PyHpPyImPy-γ-HpPyImPyHp
843)	5′-W A T C C T W-3′	PyHpPyPyHp-γ-PyImImPyHp
844)	5′-W A T C C A W-3′	PyHpPyPyPy-γ-HpImImPyHp
845)	5′-W A T C G G W-3′	PyHpPyImIm-γ-PyPyImPyHp
846)	5′-W A T C G C W-3′	PyHpPyImPy-γ-ImPyImPyHp
847)	5′-W A T C C G W-3′	PyHpPyPyIm-γ-PyImImPyHp
848)	5′-W A T C C C W-3′	PyHpPyPyPy-γ-ImImImPyHp

TABLE 40: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAAWNNW-3'

	DNA sequence	aromatic amino acid sequence
849)	5'-W A A T T T W-3'	PyPyHpHpHp-γ-PyPyPyHpHp
850)	5'-W A A T T A W-3'	PyPyHpHpPy-γ-HpPyPyHpHp
851)	5'-W A A T T G W-3'	PyPyHpHpIm-γ-PyPyPyHpHp
852)	5'-W A A T T C W-3'	PyPyHpHpPy-γ-ImPyPyHpHp
853)	5'-W A A T A T W-3'	PyPyHpPyHp-γ-PyHpPyHpHp
854)	5'-W A A T A A W-3'	PyPyHpPyPy-γ-HpHpPyHpHp
855)	5'-W A A T A G W-3'	PyPyHpPyIm-γ-PyHpPyHpHp
856)	5'-W A A T A C W-3'	PyPyHpPyPy-γ-ImHpPyHpHp
857)	5'-W A A T G T W-3'	PyPyHpImHp-γ-PyPyPyHpHp
858)	5'-W A A T G A W-3'	PyPyHpImPy-γ-HpPyPyHpHp
859)	5'-W A A T G G W-3'	PyPyHpImIm-γ-PyPyPyHpHp
860)	5'-W A A T G C W-3'	PyPyHpImPy-γ-ImPyPyHpHp
861)	5'-W A A T C T W-3'	PyPyHpPyHp-γ-PyImPyHpHp
862)	5'-W A A T C A W-3'	PyPyHpPyPy-γ-HpImPyHpHp
863)	5'-W A A T C G W-3'	PyPyHpPyIm-γ-PyImPyHpHp
864)	5'-W A A T C C W-3'	PyPyHpPyPy-γ-ImImPyHpHp
865)	5'-W A A A T T W-3'	PyPyPyHpHp-γ-PyPyHpHpHp
866)	5'-W A A A T A W-3'	PyPyPyHpPy-γ-HpPyHpHpHp
867)	5'-W A A A T G W-3'	PyPyPyHpIm-γ-PyPyHpHpHp
868)	5'-W A A A T C W-3'	PyPyPyHpPy-γ-ImPyHpHpHp
869)	5'-W A A A A T W-3'	PyPyPyPyHp-γ-PyHpHpHpHp
870)	5'-W A A A A A W-3'	PyPyPyPyPy-γ-HpHpHpHpHp
871)	5'-W A A A A G W-3'	PyPyPyPyIm-γ-PyHpHpHpHp
872)	5'-W A A A A C W-3'	PyPyPyPyPy-γ-ImHpHpHpHp
873)	5'-W A A A G T W-3'	PyPyPyImHp-γ-PyPyHpHpHp
874)	5'-W A A A G A W-3'	PyPyPyImPy-γ-HpPyHpHpHp
875)	5'-W A A A G G W-3'	PyPyPyImIm-γ-PyPyHpHpHp
876)	5'-W A A A G C W-3'	PyPyPyImPy-γ-ImPyHpHpHp
877)	5'-W A A A C T W-3'	PyPyPyPyHp-γ-PyImHpHpHp
878)	5'-W A A A C A W-3'	PyPyPyPyPy-γ-HpImHpHpHp
879)	5'-W A A A C G W-3'	PyPyPyPyIm-γ-PyImHpHpHp
880)	5'-W A A A C C W-3'	PyPyPyPyPy-γ-ImImHpHpHp

TABLE 41: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAASNNW-3'

	DNA sequence	aromatic amino acid sequence
881)	5'-W A A G T T W-3'	PyPyImHpHp-γ-PyPyPyHpHp
882)	5'-W A A G T A W-3'	PyPyImHpPy-γ-HpPyPyHpHp
883)	5'-W A A G T G W-3'	PyPyImHpIm-γ-PyPyPyHpHp
884)	5'-W A A G T C W-3'	PyPyImHpPy-γ-ImPyPyHpHp
885)	5'-W A A G A T W-3'	PyPyImPyHp-γ-PyHpPyHpHp
886)	5'-W A A G A A W-3'	PyPyImPyPy-γ-HpHpPyHpHp
887)	5'-W A A G A G W-3'	PyPyImPyIm-γ-PyHpPyHpHp
888)	5'-W A A G A C W-3'	PyPyImPyPy-γ-ImHpPyHpHp
889)	5'-W A A G G T W-3'	PyPyImImHp-γ-PyPyPyHpHp
890)	5'-W A A G G A W-3'	PyPyImImPy-γ-HpPyPyHpHp
891)	5'-W A A G C T W-3'	PyPyImPyHp-γ-PyImPyHpHp
892)	5'-W A A G C A W-3'	PyPyImPyPy-γ-HpImPyHpHp
893)	5'-W A A G G G W-3'	PyPyImImIm-γ-PyPyPyHpHp
894)	5'-W A A G G C W-3'	PyPyImImPy-γ-ImPyPyHpHp
895)	5'-W A A G C G W-3'	PyPyImPyIm-γ-PyImPyHpHp
896)	5'-W A A G C C W-3'	PyPyImPyPy-γ-ImImPyHpHp
897)	5'-W A A C T T W-3'	PyPyPyHpHp-γ-PyPyImHpHp
898)	5'-W A A C T A W-3'	PyPyPyHpPy-γ-HpPyImHpHp
899)	5'-W A A C T G W-3'	PyPyPyHpIm-γ-PyPyImHpHp
900)	5'-W A A C T C W-3'	PyPyPyHpPy-γ-ImPyImHpHp
901)	5'-W A A C A T W-3'	PyPyPyPyHp-γ-PyHpImHpHp
902)	5'-W A A C A A W-3'	PyPyPyPyPy-γ-HpHpImHpHp
903)	5'-W A A C A G W-3'	PyPyPyPyIm-γ-PyHpImHpHp
904)	5'-W A A C A C W-3'	PyPyPyPyPy-γ-ImHpImHpHp
905)	5'-W A A C G T W-3'	PyPyPyImHp-γ-PyPyImHpHp
906)	5'-W A A C G A W-3'	PyPyPyImPy-γ-HpPyImHpHp
907)	5'-W A A C C T W-3'	PyPyPyPyHp-γ-PyImImHpHp
908)	5'-W A A C C A W-3'	PyPyPyPyPy-γ-HpImImHpHp
909)	5'-W A A C G G W-3'	PyPyPyImIm-γ-PyPyImHpHp
910)	5'-W A A C G C W-3'	PyPyPyImPy-γ-ImPyImHpHp
911)	5'-W A A C C G W-3'	PyPyPyPyIm-γ-PyImImHpHp
912)	5'-W A A C C C W-3'	PyPyPyPyPy-γ-ImImImHpHp

TABLE 42: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACWNNW-3'

	DNA sequence	aromatic amino acid sequence
913)	5'-W A C T T T W-3'	PyPyHpHpHp-γ-PyPyPyImHp
914)	5'-W A C T T A W-3'	PyPyHpHpPy-γ-HpPyPyImHp
915)	5'-W A C T T G W-3'	PyPyHpHpIm-γ-PyPyPyImHp
916)	5'-W A C T T C W-3'	PyPyHpHpPy-γ-ImPyPyImHp
917)	5'-W A C T A T W-3'	PyPyHpPyHp-γ-PyHpPyImHp
918)	5'-W A C T A A W-3'	PyPyHpPyPy-γ-HpHpPyImHp
919)	5'-W A C T A G W-3'	PyPyHpPyIm-γ-PyHpPyImHp
920)	5'-W A C T A C W-3'	PyPyHpPyPy-γ-ImHpPyImHp
921)	5'-W A C T G T W-3'	PyPyHpImHp-γ-PyPyPyImHp
922)	5'-W A C T G A W-3'	PyPyHpImPy-γ-HpPyPyImHp
923)	5'-W A C T G G W-3'	PyPyHpImIm-γ-PyPyPyImHp
924)	5'-W A C T G C W-3'	PyPyHpImPy-γ-ImPyPyImHp
925)	5'-W A C T C T W-3'	PyPyHpPyHp-γ-PyImPyImHp
926)	5'-W A C T C A W-3'	PyPyHpPyPy-γ-HpImPyImHp
927)	5'-W A C T C G W-3'	PyPyHpPyIm-γ-PyImPyImHp
928)	5'-W A C T C C W-3'	PyPyHpPyPy-γ-ImImPyImHp
929)	5'-W A C A T T W-3'	PyPyPyHpHp-γ-PyPyHpImHp
930)	5'-W A C A T A W-3'	PyPyPyHpPy-γ-HpPyHpImHp
931)	5'-W A C A T G W-3'	PyPyPyHpIm-γ-PyPyHpImHp
932)	5'-W A C A T C W-3'	PyPyPyHpPy-γ-ImPyHpImHp
933)	5'-W A C A A T W-3'	PyPyPyPyHp-γ-PyHpHpImHp
934)	5'-W A C A A A W-3'	PyPyPyPyPy-γ-HpHpHpImHp
935)	5'-W A C A A G W-3'	PyPyPyPyIm-γ-PyHpHpImHp
936)	5'-W A C A A C W-3'	PyPyPyPyPy-γ-ImHpHpImHp
937)	5'-W A C A G T W-3'	PyPyPyImHp-γ-PyPyHpImHp
938)	5'-W A C A G A W-3'	PyPyPyImPy-γ-HpPyHpImHp
939)	5'-W A C A G G W-3'	PyPyPyImIm-γ-PyPyHpImHp
940)	5'-W A C A G C W-3'	PyPyPyImPy-γ-ImPyHpImHp
941)	5'-W A C A C T W-3'	PyPyPyPyHp-γ-PyImHpImHp
942)	5'-W A C A C A W-3'	PyPyPyPyPy-γ-HpImHpImHp
943)	5'-W A C A C G W-3'	PyPyPyPyIm-γ-PyImHpImHp
944)	5'-W A C A C C W-3'	PyPyPyPyPy-γ-ImImHpImHp

TABLE 43: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACSNNW-3'

	DNA sequence	aromatic amino acid sequence
945)	5'-W A C G T T W-3'	PyPyImHpHp-γ-PyPyPyImHp
946)	5'-W A C G T A W-3'	PyPyImHpPy-γ-HpPyPyImHp
947)	5'-W A C G T G W-3'	PyPyImHpIm-γ-PyPyPyImHp
948)	5'-W A C G T C W-3'	PyPyImHpPy-γ-ImPyPyImHp
949)	5'-W A C G A T W-3'	PyPyImPyHp-γ-PyHpPyImHp
950)	5'-W A C G A A W-3'	PyPyImPyPy-γ-HpHpPyImHp
951)	5'-W A C G A G W-3'	PyPyImPyIm-γ-PyHpPyImHp
952)	5'-W A C G A C W-3'	PyPyImPyPy-γ-ImHpPyImHp
953)	5'-W A C G G T W-3'	PyPyImImHp-γ-PyPyPyImHp
954)	5'-W A C G G A W-3'	PyPyImImPy-γ-HpPyPyImHp
955)	5'-W A C G C T W-3'	PyPyImPyHp-γ-PyImPyImHp
956)	5'-W A C G C A W-3'	PyPyImPyPy-γ-HpImPyImHp
957)	5'-W A C C T T W-3'	PyPyPyHpHp-γ-PyPyImImHp
958)	5'-W A C C T A W-3'	PyPyPyHpPy-γ-HpPyImImHp
959)	5'-W A C C T G W-3'	PyPyPyHpIm-γ-PyPyImImHp
960)	5'-W A C C T C W-3'	PyPyPyHpPy-γ-ImPyImImHp
961)	5'-W A C C A T W-3'	PyPyPyPyHp-γ-PyHpImImHp
962)	5'-W A C C A A W-3'	PyPyPyPyPy-γ-HpHpImImHp
963)	5'-W A C C A G W-3'	PyPyPyPyIm-γ-PyHpImImHp
964)	5'-W A C C A C W-3'	PyPyPyPyPy-γ-ImHpImImHp
965)	5'-W A C C G T W-3'	PyPyPyImHp-γ-PyPyImImHp
966)	5'-W A C C G A W-3'	PyPyPyImPy-γ-HpPyImImHp
967)	5'-W A C C C T W-3'	PyPyPyPyHp-γ-PyImImImHp
968)	5'-W A C C C A W-3'	PyPyPyPyPy-γ-HpImImImHp
969)	5'-W A C G G G W-3'	PyPyImImIm-γ-PyPyPyImHp
970)	5'-W A C G G C W-3'	PyPyImImPy-γ-ImPyPyImHp
971)	5'-W A C G C G W-3'	PyPyImPyIm-γ-PyImPyImHp
972)	5'-W A C G C C W-3'	PyPyImPyPy-γ-ImImPyImHp
973)	5'-W A C C G G W-3'	PyPyPyImIm-γ-PyPyImImHp
974)	5'-W A C C G C W-3'	PyPyPyImPy-γ-ImPyImImHp
975)	5'-W A C C C G W-3'	PyPyPyPyIm-γ-PyImImImHp
976)	5'-W A C C C C W-3'	PyPyPyPyPy-γ-ImImImImHp

TABLE 44: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGWNNW-3'

	DNA sequence	aromatic amino acid sequence
977)	5'-W T G T T T W-3'	HpImHpHpHp-γ-PyPyPyPyPy
978)	5'-W T G T T A W-3'	HpImHpHpPy-γ-HpPyPyPyPy
979)	5'-W T G T T G W-3'	HpImHpHpIm-γ-PyPyPyPyPy
980)	5'-W T G T T C W-3'	HpImHpHpPy-γ-ImPyPyPyPy
981)	5'-W T G T A T W-3'	HpImHpPyHp-γ-PyHpPyPyPy
982)	5'-W T G T A A W-3'	HpImHpPyPy-γ-HpHpPyPyPy
983)	5'-W T G T A G W-3'	HpImHpPyIm-γ-PyHpPyPyPy
984)	5'-W T G T A C W-3'	HpImHpPyPy-γ-ImHpPyPyPy
985)	5'-W T G T G T W-3'	HpImHpImHp-γ-PyPyPyPyPy
986)	5'-W T G T G A W-3'	HpImHpImPy-γ-HpPyPyPyPy
987)	5'-W T G T G G W-3'	HpImHpImIm-γ-PyPyPyPyPy
988)	5'-W T G T G C W-3'	HpImHpImPy-γ-ImPyPyPyPy
989)	5'-W T G T C T W-3'	HpImHpPyHp-γ-PyImPyPyPy
990)	5'-W T G T C A W-3'	HpImHpPyPy-γ-HpImPyPyPy
991)	5'-W T G T C G W-3'	HpImHpPyIm-γ-PyImPyPyPy
992)	5'-W T G T C C W-3'	HpImHpPyPy-γ-ImImPyPyPy
993)	5'-W T G A T T W-3'	HpImPyHpHp-γ-PyPyHpPyPy
994)	5'W T G A T A W-3'	HpImPyHpPy-γ-HpPyHpPyPy
995)	5'-W T G A T G W-3'	HpImPyHpIm-γ-PyPyHpPyPy
996)	5'-W T G A T C W-3'	HpImPyHpPy-γ-ImPyHpPyPy
997)	5'-W T G A A T W-3'	HpImPyPyHp-γ-PyHpHpPyPy
998)	5'-W T G A A A W-3'	HpImPyPyPy-γ-HpHpHpPyPy
999)	5'-W T G A A G W-3'	HpImPyPyIm-γ-PyHpHpPyPy
1000)	5'-W T G A A C W-3'	HpImPyPyPy-γ-ImHpHpPyPy
1001)	5'-W T G A G T W-3'	HpImPyImHp-γ-PyPyHpPyPy
1002)	5'-W T G A G A W-3'	HpImPyImPy-γ-HpPyHpPyPy
1003)	5'-W T G A G G W-3'	HpImPyImIm-γ-PyPyHpPyPy
1004)	5'-W T G A G C W-3'	HpImPyImPy-γ-ImPyHpPyPy
1005)	5'-W T G A C T W-3'	HpImPyPyHp-γ-PyImHpPyPy
1006)	5'-W T G A C A W-3'	HpImPyPyPy-γ-HpImHpPyPy
1007)	5'-W T G A C G W-3'	HpImPyPyIm-γ-PyImHpPyPy
1008)	5'-W T G A C C W-3'	HpImPyPyPy-γ-ImImHpPyPy

TABLE 45: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGSNNW-3'

	DNA sequence	aromatic amino acid sequence
1009)	5'-W T G G T T W-3'	HpImImHpHp-γ-PyPyPyPyPy
1010)	5'-W T G G T A W-3'	HpImImHpPy-γ-HpPyPyPyPy
1011)	5'-W T G G T G W-3'	HpImImHpIm-γ-PyPyPyPyPy
1012)	5'-W T G G T C W-3'	HpImImHpPy-γ-ImPyPyPyPy
1013)	5'-W T G G A T W-3'	HpImImPyHp-γ-PyHpPyPyPy
1014)	5'-W T G G A A W-3'	HpImImPyPy-γ-HpHpPyPyPy
1015)	5'-W T G G A G W-3'	HpImImPyIm-γ-PyHpPyPyPy
1016)	5'-W T G G A C W-3'	HpImImPyPy-γ-ImHpPyPyPy
1017)	5'-W T G G G T W-3'	HpImImImHp-γ-PyPyPyPyPy
1018)	5'-W T G G G A W-3'	HpImImImPy-γ-HpPyPyPyPy
1019)	5'-W T G G C T W-3'	HpImImPyHp-γ-PyImPyPyPy
1020)	5'-W T G G C A W-3'	HpImImPyPy-γ-HpImPyPyPy
1021)	5'-W T G C T T W-3'	HpImPyHpHp-γ-PyPyImPyPy
1022)	5'-W T G C T A W-3'	HpImPyHpPy-γ-HpPyImPyPy
1023)	5'-W T G C T G W-3'	HpImPyHpIm-γ-PyPyImPyPy
1024)	5'-W T G C T C W-3'	HpImPyHpPy-γ-ImPyImPyPy
1025)	5'-W T G C A T W-3'	HpImPyPyHp-γ-PyHpImPyPy
1026)	5'-W T G C A A W-3'	HpImPyPyPy-γ-HpHpImPyPy
1027)	5'-W T G C A G W-3'	HpImPyPyIm-γ-PyHpImPyPy
1028)	5'-W T G C A C W-3'	HpImPyPyPy-γ-ImHpImPyPy
1029)	5'-W T G C G T W-3'	HpImPyImHp-γ-PyPyImPyPy
1030)	5'-W T G C G A W-3'	HpImPyImPy-γ-HpPyImPyPy
1031)	5'-W T G C C T W-3'	HpImPyPyHp-γ-PyImImPyPy
1032)	5'-W T G C C A W-3'	HpImPyPyPy-γ-HpImImPyPy
1033)	5'-W T G G G G W-3'	HpImImImIm-γ-PyPyPyPyPy
1034)	5'-W T G G G C W-3'	HpImImImPy-γ-ImPyPyPyPy
1035)	5'-W T G G C G W-3'	HpImImPyIm-γ-PyImPyPyPy
1036)	5'-W T G G C C W-3'	HpImImPyPy-γ-ImImPyPyPy
1037)	5'-W T G C G G W-3'	HpImPyImIm-γ-PyPyImPyPy
1038)	5'-W T G C G C W-3'	HpImPyImPy-γ-ImPyImPyPy
1039)	5'-W T G C C G W-3'	HpImPyPyIm-γ-PyImImPyPy
1040)	5'-W T G C C C W-3'	HpImPyPyPy-γ-ImImImPyPy

TABLE 46: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTTWNNW-3'

	DNA sequence	aromatic amino acid sequence
1041)	5'-W T T T T T W-3'	HpHpHpHpHp-γ-PyPyPyPyPy
1042)	5'-W T T T T A W-3'	HpHpHpHpPy-γ-HpPyPyPyPy
1043)	5'-W T T T T G W-3'	HpHpHpHpIm-γ-PyPyPyPyPy
1044)	5'-W T T T T C W-3'	HpHpHpHpPy-γ-ImPyPyPyPy
1045)	5'-W T T T A T W-3'	HpHpHpPyHp-γ-PyHpPyPyPy
1046)	5'-W T T T A A W-3'	HpHpHpPyPy-γ-HpHpPyPyPy
1047)	5'-W T T T A G W-3'	HpHpHpPyIm-γ-PyHpPyPyPy
1048)	5'-W T T T A C W-3'	HpHpHpPyPy-γ-ImHpPyPyPy
1049)	5'-W T T T G T W-3'	HpHpHpImHp-γ-PyPyPyPyPy
1050)	5'-W T T T G A W-3'	HpHpHpImPy-γ-HpPyPyPyPy
1051)	5'-W T T T G G W-3'	HpHpHpImIm-γ-PyPyPyPyPy
1052)	5'-W T T T G C W-3'	HpHpHpImPy-γ-ImPyPyPyPy
1053)	5'-W T T T C T W-3'	HpHpHpPyHp-γ-PyImPyPyPy
1054)	5'-W T T T C A W-3'	HpHpHpPyPy-γ-HpImPyPyPy
1055)	5'-W T T T C G W-3'	HpHpHpPyIm-γ-PyImPyPyPy
1056)	5'-W T T T C C W-3'	HpHpHpPyPy-γ-ImImPyPyPy
1057)	5'-W T T A T T W-3'	HpHpPyHpHp-γ-PyPyHpPyPy
1058)	5'-W T T A T A W-3'	HpHpPyHpPy-γ-HpPyHpPyPy
1059)	5'-W T T A T G W-3'	HpHpPyHpIm-γ-PyPyHpPyPy
1060)	5'-W T T A T C W-3'	HpHpPyHpPy-γ-ImPyHpPyPy
1061)	5'-W T T A A T W-3'	HpHpPyPyHp-γ-PyHpHpPyPy
1062)	5'-W T T A A A W-3'	HpHpPyPyPy-γ-HpHpHpPyPy
1063)	5'-W T T A A G W-3'	HpHpPyPyIm-γ-PyHpHpPyPy
1064)	5'-W T T A A C W-3'	HpHpPyPyPy-γ-ImHpHpPyPy
1065)	5'-W T T A G T W-3'	HpHpPyImHp-γ-PyPyHpPyPy
1066)	5'-W T T A G A W-3'	HpHpPyImPy-γ-HpPyHpPyPy
1067)	5'-W T T A G G W-3'	HpHpPyImIm-γ-PyPyHpPyPy
1068)	5'-W T T A G C W-3'	HpHpPyImPy-γ-ImPyHpPyPy
1069)	5'-W T T A C T W-3'	HpHpPyPyHp-γ-PyImHpPyPy
1070)	5'-W T T A C A W-3'	HpHpPyPyPy-γ-HpImHpPyPy
1071)	5'-W T T A C G W-3'	HpHpPyPyIm-γ-PyImHpPyPy
1072)	5'-W T T A C C W-3'	HpHpPyPyPy-γ-ImImHpPyPy

TABLE 47: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTTSNNW-3'

	DNA sequence	aromatic amino acid sequence
1073)	5'-W T T G T T W-3'	HpHpImHpHp-γ-PyPyPyPyPy
1074)	5'-W T T G T A W-3'	HpHpImHpPy-γ-HpPyPyPyPy
1075)	5'-W T T G T G W-3'	HpHpImHpIm-γ-PyPyPyPyPy
1076)	5'-W T T G T C W-3'	HpHpImHpPy-γ-ImPyPyPyPy
1077)	5'-W T T G A T W-3'	HpHpImPyHp-γ-PyHpPyPyPy
1078)	5'-W T T G A A W-3'	HpHpImPyPy-γ-HpHpPyPyPy
1079)	5'-W T T G A G W-3'	HpHpImPyIm-γ-PyHpPyPyPy
1080)	5'-W T T G A C W-3'	HpHpImPyPy-γ-ImHpPyPyPy
1081)	5'-W T T G G T W-3'	HpHpImImHp-γ-PyPyPyPyPy
1082)	5'-W T T G G A W-3'	HpHpImImPy-γ-HpPyPyPyPy
1083)	5'-W T T G C T W-3'	HpHpImPyHp-γ-PyImPyPyPy
1084)	5'-W T T G C A W-3'	HpHpImPyPy-γ-HpImPyPyPy
1085)	5'-W T T G G G W-3'	HpHpImImIm-γ-PyPyPyPyPy
1086)	5'-W T T G G C W-3'	HpHpImImPy-γ-ImPyPyPyPy
1087)	5'-W T T G C G W-3'	HpHpImPyIm-γ-PyImPyPyPy
1088)	5'-W T T G C C W-3'	HpHpImPyPy-γ-ImImPyPyPy
1089)	5'-W T T C T T W-3'	HpHpPyHpHp-γ-PyPyImPyPy
1090)	5'-W T T C T A W-3'	HpHpPyHpPy-γ-HpPyImPyPy
1091)	5'-W T T C T G W-3'	HpHpPyHpIm-γ-PyPyImPyPy
1092)	5'-W T T C T C W-3'	HpHpPyHpPy-γ-ImPyImPyPy
1093)	5'-W T T C A T W-3'	HpHpPyPyHp-γ-PyHpImPyPy
1094)	5'-W T T C A A W-3'	HpHpPyPyPy-γ-HpHpImPyPy
1095)	5'-W T T C A G W-3'	HpHpPyPyIm-γ-PyHpImPyPy
1096)	5'-W T T C A C W-3'	HpHpPyPyPy-γ-ImHpImPyPy
1097)	5'-W T T C G T W-3'	HpHpPyImHp-γ-PyPyImPyPy
1098)	5'-W T T C G A W-3'	HpHpPyImPy-γ-HpPyImPyPy
1099)	5'-W T T C C T W-3'	HpHpPyPyHp-γ-PyImImPyPy
1100)	5'-W T T C C A W-3'	HpHpPyPyPy-γ-HpImImPyPy
1101)	5'-W T T C G G W-3'	HpHpPyImIm-γ-PyPyImPyPy
1102)	5'-W T T C G C W-3'	HpHpPyImPy-γ-ImPyImPyPy
1103)	5'-W T T C C G W-3'	HpHpPyPyIm-γ-PyImImPyPy
1104)	5'-W T T C C C W-3'	HpHpPyPyPy-γ-ImImImPyPy

TABLE 48: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTAWNNW-3'

	DNA sequence	aromatic amino acid sequence
1105)	5'-W T A T T T W-3'	HpPyHpHpHp-γ-PyPyPyHpPy
1106)	5'-W T A T T A W-3'	HpPyHpHpPy-γ-HpPyPyHpPy
1107)	5'-W T A T T G W-3'	HpPyHpHpIm-γ-PyPyPyHpPy
1108)	5'-W T A T T C W-3'	HpPyHpHpPy-γ-ImPyPyHpPy
1109)	5'-W T A T A T W-3'	HpPyHpPyHp-γ-PyHpPyHpPy
1110)	5'-W T A T A A W-3'	HpPyHpPyPy-γ-HpHpPyHpPy
1111)	5'-W T A T A G W-3'	HpPyHpPyIm-γ-PyHpPyHpPy
1112)	5'-W T A T A C W-3'	HpPyHpPyPy-γ-ImHpPyHpPy
1113)	5'-W T A T G T W-3'	HpPyHpImHp-γ-PyPyPyHpPy
1114)	5'-W T A T G A W-3'	HpPyHpImPy-γ-HpPyPyHpPy
1115)	5'-W T A T G G W-3'	HpPyHpImIm-γ-PyPyPyHpPy
1116)	5'-W T A T G C W-3'	HpPyHpImPy-γ-ImPyPyHpPy
1117)	5'-W T A T C T W-3'	HpPyHpPyHp-γ-PyImPyHpPy
1118)	5'-W T A T C A W-3'	HpPyHpPyPy-γ-HpImPyHpPy
1119)	5'-W T A T C G W-3'	HpPyHpPyIm-γ-PyImPyHpPy
1120)	5'-W T A T C C W-3'	HpPyHpPyPy-γ-ImImPyHpPy
1121)	5'-W T A A T T W-3'	HpPyPyHpHp-γ-PyPyHpHpPy
1122)	5'-W T A A T A W-3'	HpPyPyHpPy-γ-HpPyHpHpPy
1123)	5'-W T A A T G W-3'	HpPyPyHpIm-γ-PyPyHpHpPy
1124)	5'-W T A A T C W-3'	HpPyPyHpPy-γ-ImPyHpHpPy
1125)	5'-W T A A A T W-3'	HpPyPyPyHp-γ-PyHpHpHpPy
1126)	5'-W T A A A A W-3'	HpPyPyPyPy-γ-HpHpHpHpPy
1127)	5'-W T A A A G W-3'	HpPyPyPyIm-γ-PyHpHpHpPy
1128)	5'-W T A A A C W-3'	HpPyPyPyPy-γ-ImHpHpHpPy
1129)	5'-W T A A G T W-3'	HpPyPyImHp-γ-PyPyHpHpPy
1130)	5'-W T A A G A W-3'	HpPyPyImPy-γ-HpPyHpHpPy
1131)	5'-W T A A G G W-3'	HpPyPyImIm-γ-PyPyHpHpPy
1132)	5'-W T A A G C W-3'	HpPyPyImPy-γ-ImPyHpHpPy
1133)	5'-W T A A C T W-3'	HpPyPyPyHp-γ-PyImHpHpPy
1134)	5'-W T A A C A W-3'	HpPyPyPyPy-γ-HpImHpHpPy
1135)	5'-W T A A C G W-3'	HpPyPyPyIm-γ-PyImHpHpPy
1136)	5'-W T A A C C W-3'	HpPyPyPyPy-γ-ImImHpHpPy

TABLE 49: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTASNNW-3'

	DNA sequence	aromatic amino acid sequence
1137)	5'-W T A G T T W-3'	HpPyImHpHp-γ-PyPyPyHpPy
1138)	5'-W T A G T A W-3'	HpPyImHpPy-γ-HpPyPyHpPy
1139)	5'-W T A G T G W-3'	HpPyImHpIm-γ-PyPyPyHpPy
1140)	5'-W T A G T C W-3'	HpPyImHpPy-γ-ImPyPyHpPy
1141)	5'-W T A G A T W-3'	HpPyImPyHp-γ-PyHpPyHpPy
1142)	5'-W T A G A A W-3'	HpPyImPyPy-γ-HpHpPyHpPy
1143)	5'-W T A G A G W-3'	HpPyImPyIm-γ-PyHpPyHpPy
1144)	5'-W T A G A C W-3'	HpPyImPyPy-γ-ImHpPyHpPy
1145)	5'-W T A G G T W-3'	HpPyImImHp-γ-PyPyPyHpPy
1146)	5'-W T A G G A W-3'	HpPyImImPy-γ-HpPyPyHpPy
1147)	5'-W T A G C T W-3'	HpPyImPyHp-γ-PyImPyHpPy
1148)	5'-W T A G C A W-3'	HpPyImPyPy-γ-HpImPyHpPy
1149)	5'-W T A G G G W-3'	HpPyImImIm-γ-PyPyPyHpPy
1150)	5'-W T A G G C W-3'	HpPyImImPy-γ-ImPyPyHpPy
1151)	5'-W T A G C G W-3'	HpPyImPyIm-γ-PyImPyHpPy
1152)	5'-W T A G C C W-3'	HpPyImPyPy-γ-ImImPyHpPy
1153)	5'-W T A C T T W-3'	HpPyPyHpHp-γ-PyPyImHpPy
1154)	5'-W T A C T A W-3'	HpPyPyHpPy-γ-HpPyImHpPy
1155)	5'-W T A C T G W-3'	HpPyPyHpIm-γ-PyPyImHpPy
1156)	5'-W T A C T C W-3'	HpPyPyHpPy-γ-ImPyImHpPy
1157)	5'-W T A C A T W-3'	HpPyPyPyHp-γ-PyHpImHpPy
1158)	5'-W T A C A A W-3'	HpPyPyPyPy-γ-HpHpImHpPy
1159)	5'-W T A C A G W-3'	HpPyPyPyIm-γ-PyHpImHpPy
1160)	5'-W T A C A C W-3'	HpPyPyPyPy-γ-ImHpImHpPy
1161)	5'-W T A C G T W-3'	HpPyPyImHp-γ-PyPyImHpPy
1162)	5'-W T A C G A W-3'	HpPyPyImPy-γ-HpPyImHpPy
1163)	5'-W T A C C T W-3'	HpPyPyPyHp-γ-PyImImHpPy
1164)	5'-W T A C C A W-3'	HpPyPyPyPy-γ-HpImImHpPy
1165)	5'-W T A C G G W-3'	HpPyPyImIm-γ-PyPyImHpPy
1166)	5'-W T A C G C W-3'	HpPyPyImPy-γ-ImPyImHpPy
1167)	5'-W T A C C G W-3'	HpPyPyPyIm-γ-PyImImHpPy
1168)	5'-W T A C C C W-3'	HpPyPyPyPy-γ-ImImImHpPy

TABLE 50: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCWNNW-3'

	DNA sequence	aromatic amino acid sequence
1169)	5'-W T C T T T W-3'	HpPyHpHpHp-γ-PyPyPyImPy
1170)	5'-W T C T T A W-3'	HpPyHpHpPy-γ-HpPyPyImPy
1171)	5'-W T C T T G W-3'	HpPyHpHpIm-γ-PyPyPyImPy
1172)	5'-W T C T T C W-3'	HpPyHpHpPy-γ-ImPyPyImPy
1173)	5'-W T C T A T W-3'	HpPyHpPyHp-γ-PyHpPyImPy
1174)	5'-W T C T A A W-3'	HpPyHpPyPy-γ-HpHpPyImPy
1175)	5'-W T C T A G W-3'	HpPyHpPyIm-γ-PyHpPyImPy
1176)	5'-W T C T A C W-3'	HpPyHpPyPy-γ-ImHpPyImPy
1177)	5'-W T C T G T W-3'	HpPyHpImHp-γ-PyPyPyImPy
1178)	5'-W T C T G A W-3'	HpPyHpImPy-γ-HpPyPyImPy
1179)	5'-W T C T G G W-3'	HpPyHpImIm-γ-PyPyPyImPy
1180)	5'-W T C T G C W-3'	HpPyHpImPy-γ-ImPyPyImPy
1181)	5'-W T C T C T W-3'	HpPyHpPyHp-γ-PyImPyImPy
1182)	5'-W T C T C A W-3'	HpPyHpPyPy-γ-HpImPyImPy
1183)	5'-W T C T C G W-3'	HpPyHpPyIm-γ-PyImPyImPy
1184)	5'-W T C T C C W-3'	HpPyHpPyPy-γ-ImImPyImPy
1185)	5'-W T C A T T W-3'	HpPyPyHpHp-γ-PyPyHpImPy
1186)	5'-W T C A T A W-3'	HpPyPyHpPy-γ-HpPyHpImPy
1187)	5'-W T C A T G W-3'	HpPyPyHpIm-γ-PyPyHpImPy
1188)	5'-W T C A T C W-3'	HpPyPyHpPy-γ-ImPyHpImPy
1189)	5'-W T C A A T W-3'	HpPyPyPyHp-γ-PyHpHpImPy
1190)	5'-W T C A A A W-3'	HpPyPyPyPy-γ-HpHpHpImPy
1191)	5'-W T C A A G W-3'	HpPyPyPyIm-γ-PyHpHpImPy
1192)	5'-W T C A A C W-3'	HpPyPyPyPy-γ-ImHpHpImPy
1193)	5'-W T C A G T W-3'	HpPyPyImHp-γ-PyPyHpImPy
1194)	5'-W T C A G A W-3'	HpPyPyImPy-γ-HpPyHpImPy
1195)	5'-W T C A G G W-3'	HpPyPyImIm-γ-PyPyHpImPy
1196)	5'-W T C A G C W-3'	HpPyPyImPy-γ-ImPyHpImPy
1197)	5'-W T C A C T W-3'	HpPyPyPyHp-γ-PyImHpImPy
1198)	5'-W T C A C A W-3'	HpPyPyPyPy-γ-HpImHpImPy
1199)	5'-W T C A C G W-3'	HpPyPyPyIm-γ-PyImHpImPy
1200)	5'-W T C A C C W-3'	HpPyPyPyPy-γ-ImImHpImPy

TABLE 51: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCSNNW-3'

	DNA sequence	aromatic amino acid sequence
1201)	5'-W T C G T T W-3'	HpPyImHpHp-γ-PyPyPyImPy
1202)	5'-W T C G T A W-3'	HpPyImHpPy-γ-HpPyPyImPy
1203)	5'-W T C G T G W-3'	HpPyImHpIm-γ-PyPyPyImPy
1204)	5'-W T C G T C W-3'	HpPyImHpPy-γ-ImPyPyImPy
1205)	5'-W T C G A T W-3'	HpPyImPyHp-γ-PyHpPyImPy
1206)	5'-W T C G A A W-3'	HpPyImPyPy-γ-HpHpPyImPy
1207)	5'-W T C G A G W-3'	HpPyImPyIm-γ-PyHpPyImPy
1208)	5'-W T C G A C W-3'	HpPyImPyPy-γ-ImHpPyImPy
1209)	5'-W T C G G T W-3'	HpPyImImHp-γ-PyPyPyImPy
1210)	5'-W T C G G A W-3'	HpPyImImPy-γ-HpPyPyImPy
1211)	5'-W T C G C T W-3'	HpPyImPyHp-γ-PyImPyImPy
1212)	5'-W T C G C A W-3'	HpPyImPyPy-γ-HpImPyImPy
1213)	5'-W T C C T T W-3'	HpPyPyHpHp-γ-PyPyImImPy
1214)	5'-W T C C T A W-3'	HpPyPyHpPy-γ-HpPyImImPy
1215)	5'-W T C C T G W-3'	HpPyPyHpIm-γ-PyPyImImPy
1216)	5'-W T C C T C W-3'	HpPyPyHpPy-γ-ImPyImImPy
1217)	5'-W T C C A T W-3'	HpPyPyPyHp-γ-PyHpImImPy
1218)	5'-W T C C A A W-3'	HpPyPyPyPy-γ-HpHpImImPy
1219)	5'-W T C C A G W-3'	HpPyPyPyIm-γ-PyHpImImPy
1220)	5'-W T C C A C W-3'	HpPyPyPyPy-γ-ImHpImImPy
1221)	5'-W T C C G T W-3'	HpPyPyImHp-γ-PyPyImImPy
1222)	5'-W T C C G A W-3'	HpPyPyImPy-γ-HpPyImImPy
1223)	5'-W T C C C T W-3'	HpPyPyPyHp-γ-PyImImImPy
1224)	5'-W T C C C A W-3'	HpPyPyPyPy-γ-HpImImImPy
1225)	5'-W T C G G G W-3'	HpPyImImIm-γ-PyPyPyImPy
1226)	5'-W T C G G C W-3'	HpPyImImPy-γ-ImPyPyImPy
1227)	5'-W T C G C G W-3'	HpPyImPyIm-γ-PyImPyImPy
1228)	5'-W T C G C C W-3'	HpPyImPyPy-γ-ImImPyImPy
1229)	5'-W T C C G G W-3'	HpPyPyImIm-γ-PyPyImImPy
1230)	5'-W T C C G C W-3'	HpPyPyImPy-γ-ImPyImImPy
1231)	5'-W T C C C G W-3'	HpPyPyPyIm-γ-PyImImImPy
1232)	5'-W T C C C C W-3'	HpPyPyPyPy-γ-ImImImImPy

TABLE 52: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGGWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
243β)	5'-W G G T T G W-3'	ImIm-β-HpIm-γ-PyPyPyPyPy
243βp)	5'-W G G T T G W-3'	ImIm-β-HpIm-γ-PyPy-β-PyPy
247β)	5'-W G G T A G W-3'	ImIm-β-PyIm-γ-PyHpPyPyPy
247βp)	5'-W G G T A G W-3'	ImIm-β-PyIm-γ-PyHp-β-PyPy
249β)	5'-W G G T G T W-3'	ImIm-β-ImHp-γ-PyPyPyPyPy
249βp)	5'-W G G T G T W-3'	ImIm-β-ImHp-γ-PyPy-β-PyPy
250β)	5'-W G G T G A W-3'	ImIm-β-ImPy-γ-HpPyPyPyPy
250βp)	5'-W G G T G A W-3'	ImIm-β-ImPy-γ-HpPy-β-PyPy
251β)	5'-W G G T G G W-3'	ImIm-β-ImIm-γ-PyPyPyPyPy
251βp)	5'-W G G T G G W-3'	ImIm-β-ImIm-γ-PyPy-β-PyPy
252β)	5'-W G G T G C W-3'	ImIm-β-ImPy-γ-ImPyPyPyPy
252βp)	5'-W G G T G C W-3'	ImIm-β-ImPy-γ-ImPy-β-PyPy
255β)	5'-W G G T C G W-3'	ImIm-β-PyIm-γ-PyImPyPyPy
255βp)	5'-W G G T C G W-3'	ImIm-β-PyIm-γ-PyIm-β-PyPy
259β)	5'-W G G A T G W-3'	ImIm-β-HpIm-γ-PyPyHpPyPy
259βp)	5'-W G G A T G W-3'	ImIm-β-HpIm-γ-PyPy-β-PyPy
263β)	5'-W G G A A G W-3'	ImIm-β-PyIm-γ-PyHpHpPyPy
263βp)	5'-W G G A A G W-3'	ImIm-β-PyIm-γ-PyHp-β-PyPy
265β)	5'-W G G A G T W-3'	ImIm-β-ImHp-γ-PyPyHpPyPy
265βp)	5'-W G G A G T W-3'	ImIm-β-ImHp-γ-PyPy-β-PyPy
266β)	5'-W G G A G A W-3'	ImIm-β-ImPy-γ-HpPyHpPyPy
266βp)	5'-W G G A G A W-3'	ImIm-β-ImPy-γ-HpPy-β-PyPy
267β)	5'-W G G A G G W-3'	ImIm-β-ImIm-γ-PyPyHpPyPy
267βp)	5'-W G G A G G W-3'	ImIm-β-ImIm-γ-PyPy-β-PyPy
268β)	5'-W G G A G C W-3'	ImIm-β-ImPy-γ-ImPyHpPyPy
268βp)	5'-W G G A G C W-3'	ImIm-β-ImPy-γ-ImPy-β-PyPy
271β)	5'-W G G A C G W-3'	ImIm-β-PyIm-γ-PyImHpPyPy
271βp)	5'-W G G A C G W-3'	ImIm-β-PyIm-γ-PyIm-β-PyPy

TABLE 53: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
273β)	5'-W G G G T T W-3'	ImImIm-β-Hp-γ-PyPyPyPyPy
273βp)	5'-W G G G T T W-3'	ImImIm-β-Hp-γ-Py-β-PyPyPy
274β)	5'-W G G G T A W-3'	ImImIm-β-Py-γ-HpPyPyPyPy
274βp)	5'-W G G G T A W-3'	ImImIm-β-Py-γ-Hp-β-PyPyPy
275β)	5'-W G G G T G W-3'	ImImIm-β-Im-γ-PyPyPyPyPy
275βp)	5'-W G G G T G W-3'	ImImIm-β-Im-γ-Py-β-PyPyPy
276β)	5'-W G G G T C W-3'	ImImIm-β-Py-γ-ImPyPyPyPy
276βp)	5'-W G G G T C W-3'	ImImIm-β-Py-γ-Im-β-PyPyPy
277β)	5'-W G G G A T W-3'	ImImIm-β-Hp-γ-PyHpPyPyPy
277βp)	5'-W G G G A T W-3'	ImImIm-β-Hp-γ-Py-β-PyPyPy
278β)	5'-W G G G A A W-3'	ImImIm-β-Py-γ-HpHpPyPyPy
278βp)	5'-W G G G A A W-3'	ImImIm-β-Py-γ-Hp-β-PyPyPy
279β)	5'-W G G G A G W-3'	ImImIm-β-Im-γ-PyHpPyPyPy
279βp)	5'-W G G G A G W-3'	ImImIm-β-Im-γ-Py-β-PyPyPy
280β)	5'-W G G G A C W-3'	ImImIm-β-Py-γ-ImHpPyPyPy
280βp)	5'-W G G G A C W-3'	ImImIm-β-Py-γ-Im-β-PyPyPy
283β)	5'-W G G G C T W-3'	ImImIm-β-Hp-γ-PyImPyPyPy
284β)	5'-W G G G C A W-3'	ImImIm-β-Py-γ-HpImPyPyPy
285β)	5'-W G G C T T W-3'	ImImPyHpHp-γ-Py-β-ImPyPy
285βp)	5'-W G G C T T W-3'	ImImPy-β-Hp-γ-Py-β-ImPyPy
286β)	5'-W G G C T A W-3'	ImImPyHpPy-γ-Hp-β-ImPyPy
286βp)	5'-W G G C T A W-3'	ImImPy-β-Py-γ-Hp-β-ImPyPy
287β)	5'-W G G C T G W-3'	ImIm-β-HpIm-γ-Py-β-ImPyPy
288β)	5'-W G G C T C W-3'	ImImPyHpPy-γ-Im-β-ImPyPy
288βp)	5'-W G G C T C W-3'	ImImPy-β-Py-γ-Im-β-ImPyPy
289β)	5'-W G G C A T W-3'	ImImPyPyHp-γ-Py-β-ImPyPy
289βp)	5'-W G G C A T W-3'	ImImPy-β-Hp-γ-Py-β-ImPyPy
290β)	5'-W G G C A A W-3'	ImImPyPyPy-γ-Hp-β-ImPyPy
290βp)	5'-W G G C A A W-3'	ImImPy-β-Py-γ-Hp-β-ImPyPy

TABLE 53 (cont.): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
291β)	5'-W G G C A G W-3'	ImIm-β-PyIm-γ-Py-β-ImPyPy
292β)	5'-W G G C A C W-3'	ImImPyPyPy-γ-Im-β-ImPyPy
292βp)	5'-W G G C A C W-3'	ImImPy-β-Py-γ-Im-β-ImPyPy
293β)	5'-W G G C G T W-3'	ImIm-β-ImHp-γ-Py-β-ImPyPy
294β)	5'-W G G C G A W-3'	ImIm-β-ImPy-γ-Hp-β-ImPyPy
295β)	5'-W G G C C T W-3'	ImImPyPyHp-γ-PyImIm-β-Py
296β)	5'-W G G C C A W-3'	ImImPyPyPy-γ-HpImIm-β-Py
G19β)	5'-W G G G C G W-3'	ImImIm-β-Im-γ-PyImPyPyPy
G20β)	5'-W G G G C C W-3'	ImImIm-β-Py-γ-ImImPyPyPy
G21β)	5'-W G G C G G W-3'	ImIm-β-ImIm-γ-Py-β-ImPyPy
G22β)	5'-W G G C G C W-3'	ImIm-β-ImPy-γ-Im-β-ImPyPy
G23β)	5'-W G G C C G W-3'	ImIm-β-PyIm-γ-PyImIm-β-Py
G24β)	5'-W G G C C C W-3'	ImImPyPyPy-γ-ImImIm-β-Py

TABLE 54: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGTWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
299β)	5'-W G T T T G W-3'	ImHp-β-HpIm-γ-PyPyPyPyPy
299βp)	5'-W G T T T G W-3'	ImHp-β-HpIm-γ-PyPy-β-PyPy
303β)	5'-W G T T A G W-3'	ImHp-β-PyIm-γ-PyHpPyPyPy
303βp)	5'-W G T T A G W-3'	ImHp-β-PyIm-γ-PyHp-β-PyPy
305β)	5'-W G T T G T W-3'	ImHp-β-ImHp-γ-PyPyPyPyPy
305βp)	5'-W G T T G T W-3'	ImHp-β-ImHp-γ-PyPy-β-PyPy
306β)	5'-W G T T G A W-3'	ImHp-β-ImPy-γ-HpPyPyPyPy
306βp)	5'-W G T T G A W-3'	ImHp-β-ImPy-γ-HpPy-β-PyPy
307β)	5'-W G T T G G W-3'	ImHp-β-ImIm-γ-PyPyPyPyPy
307βp)	5'-W G T T G G W-3'	ImHp-β-ImIm-γ-PyPy-β-PyPy
308β)	5'-W G T T G C W-3'	ImHp-β-ImPy-γ-ImPyPyPyPy
308βp)	5'-W G T T G C W-3'	ImHp-β-ImPy-γ-ImPy-β-PyPy
311β)	5'-W G T T C G W-3'	ImHp-β-PyIm-γ-PyImPyPyPy
311βp)	5'-W G T T C G W-3'	ImHp-β-PyIm-γ-PyIm-β-PyPy
315β)	5'-W G T A T G W-3'	ImHp-β-HpIm-γ-PyPyHpPyPy
315βp)	5'-W G T A T G W-3'	ImHp-β-HpIm-γ-PyPy-β-PyPy
319β)	5'-W G T A A G W-3'	ImHp-β-PyIm-γ-PyHpHpPyPy
319βp)	5'-W G T A A G W-3'	ImHp-β-PyIm-γ-PyHp-β-PyPy
321β)	5'-W G T A G T W-3'	ImHp-β-ImHp-γ-PyPyHpPyPy
321βp)	5'-W G T A G T W-3'	ImHp-β-ImHp-γ-PyPy-β-PyPy
322β)	5'-W G T A G A W-3'	ImHp-β-ImPy-γ-HpPyHpPyPy
322βp)	5'-W G T A G A W-3'	ImHp-β-ImPy-γ-HpPy-β-PyPy
323β)	5'-W G T A G G W-3'	ImHp-β-ImIm-γ-PyPyHpPyPy
323βp)	5'-W G T A G G W-3'	ImHp-β-ImIm-γ-PyPy-β-PyPy
324β)	5'-W G T A G C W-3'	ImHp-β-ImPy-γ-ImPyHpPyPy
324βp)	5'-W G T A G C W-3'	ImHp-β-ImPy-γ-ImPy-β-PyPy
327β)	5'-W G T A C G W-3'	ImHp-β-PyIm-γ-PyImHpPyPy
327βp)	5'-W G T A C G W-3'	ImHp-β-PyIm-γ-PyIm-β-PyPy

TABLE 55: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGTSNNW-3' with β substitutions.

DNA sequence	aromatic amino acid sequence
329β) 5'-W G T G T T W-3'	Im-β-ImHpHp-γ-PyPyPyPyPy
329βp) 5'-W G T G T T W-3'	Im-β-ImHpHp-γ-PyPyPy-β-Py
330β) 5'-W G T G T A W-3'	Im-β-ImHpPy-γ-HpPyPyPyPy
330βp 5'-W G T G T A W-3'	Im-β-ImHpPy-γ-HpPyPy-β-Py
331β) 5'-W G T G T G W-3'	Im-β-ImHpIm-γ-PyPyPyPyPy
331βp) 5'-W G T G T G W-3'	Im-β-ImHpIm-γ-PyPyPy-β-Py
332β) 5'-W G T G T C W-3'	Im-β-ImHpPy-γ-ImPyPyPyPy
332βp) 5'-W G T G T C W-3'	Im-β-ImHpPy-γ-ImPyPy-β-Py
333β) 5'-W G T G A T W-3'	Im-β-ImPyHp-γ-PyHpPyPyPy
333βp) 5'-W G T G A T W-3'	Im-β-ImPyHp-γ-PyHpPy-β-Py
334β) 5'-W G T G A A W-3'	Im-β-ImPyPy-γ-HpHpPyPyPy
334βp) 5'-W G T G A A W-3'	Im-β-ImPyPy-γ-HpHpPy-β-Py
335β) 5'-W G T G A G W-3'	Im-β-ImPyIm-γ-PyHpPyPyPy
335βp) 5'-W G T G A G W-3'	Im-β-ImPyIm-γ-PyHpPy-β-Py
336β) 5'-W G T G A C W-3'	Im-β-ImPyPy-γ-ImHpPyPyPy
336βp) 5'-W G T G A C W-3'	Im-β-ImPyPy-γ-ImHpPy-β-Py
337β) 5'-W G T G G T W-3'	Im-β-ImImHp-γ-PyPyPyPyPy
337βp) 5'-W G T G G T W-3'	Im-β-ImImHp-γ-PyPyPy-β-Py
338β) 5'-W G T G G A W-3'	Im-β-ImImPy-γ-HpPyPyPyPy
338βp) 5'-W G T G G A W-3'	Im-β-ImImPy-γ-HpPyPy-β-Py
339β) 5'-W G T G C T W-3'	Im-β-ImPyHp-γ-PyImPyPyPy
339βp) 5'-W G T G C T W-3'	Im-β-ImPyHp-γ-PyImPy-β-Py
340β) 5'-W G T G C A W-3'	Im-β-ImPyPy-γ-HpImPyPyPy
340βp) 5'-W G T G C A W-3'	Im-β-ImPyPy-γ-HpImPy-β-Py
341β) 5'-W G T G G G W-3'	Im-β-ImImIm-γ-PyPyPyPyPy
341βp) 5'-W G T G G G W-3'	Im-β-ImImIm-γ-PyPyPy-β-Py
342β) 5'-W G T G G C W-3'	Im-β-ImImPy-γ-ImPyPyPyPy
342βp) 5'-W G T G G C W-3'	Im-β-ImImPy-γ-ImPyPy-β-Py
343β) 5'-W G T G C G W-3'	Im-β-ImPyIm-γ-PyImPyPyPy

TABLE 55 (cont.): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGTSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
343βp)	5'-W G T G C G W-3'	Im-β-ImPyIm-γ-PyImPy-β-Py
344β)	5'-W G T G C C W-3'	Im-β-ImPyPy-γ-ImImPyPyPy
344βp)	5'-W G T G C C W-3'	Im-β-ImPyPy-γ-ImImPy-β-Py
345β)	5'-W G T C T T W-3'	ImHpPyHpHp-γ-Py-β-ImPyPy
345βp)	5'-W G T C T T W-3'	ImHpPy-β-Hp-γ-Py-β-ImPyPy
346β)	5'-W G T C T A W-3'	ImHpPyHpPy-γ-Hp-β-ImPyPy
346βp)	5'-W G T C T A W-3'	ImHpPy-β-Py-γ-Hp-β-ImPyPy
347β)	5'-W G T C T G W-3'	ImHp-β-HpIm-γ-Py-β-ImPyPy
348β)	5'-W G T C T C W-3'	ImHpPyHpPy-γ-Im-β-ImPyPy
348βp)	5'-W G T C T C W-3'	ImHpPy-β-Py-γ-Im-β-ImPyPy
349β)	5'-W G T C A T W-3'	ImHpPyPyHp-γ-Py-β-ImPyPy
349βp)	5'-W G T C A T W-3'	ImHpPyPyHp-γ-Py-β-ImPyPy
350β)	5'-W G T C A A W-3'	ImHpPyPyPy-γ-Hp-β-ImPyPy
350βp)	5'-W G T C A A W-3'	ImHpPy-β-Py-γ-Hp-β-ImPyPy
351β)	5'-W G T C A G W-3'	ImHp-β-PyIm-γ-Py-β-ImPyPy
352β)	5'-W G T C A C W-3'	ImHpPyPyPy-γ-Im-β-ImPyPy
352βp)	5'-W G T C A C W-3'	ImHpPy-β-Py-γ-Im-β-ImPyPy
353β)	5'-W G T C G T W-3'	ImHp-β-ImHp-γ-Py-β-ImPyPy
354β)	5'-W G T C G A W-3'	ImHp-β-ImPy-γ-Hp-β-ImPyPy
355β)	5'-W G T C C T W-3'	ImHpPyPyHp-γ-PyImIm-β-Py
355βp)	5'-W G T C C T W-3'	Im-β-PyPyHp-γ-PyImIm-β-Py
356β)	5'-W G T C C A W-3'	ImHpPyPyPy-γ-HpImIm-β-Py
356βp)	5'-W G T C C A W-3'	Im-β-PyPyPy-γ-HpImIm-β-Py
357β)	5'-W G T C G G W-3'	ImHp-β-ImIm-γ-Py-β-ImPyPy
358β)	5'-W G T C G C W-3'	ImHp-β-ImPy-γ-Im-β-ImPyPy
359β)	5'-W G T C C G W-3'	ImHp-β-PyIm-γ-PyImIm-β-Py
360β)	5'-W G T C C C W-3'	ImHpPyPyPy-γ-ImImIm-β-Py
360βp)	5'-W G T C C C W-3'	Im-β-PyPyPy-γ-ImImIm-β-Py

TABLE 56: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGAWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
363β)	5'-W G A T T G W-3'	ImPy-β-HpIm-γ-PyPyPyHpPy
363βp)	5'-W G A T T G W-3'	ImPy-β-HpIm-γ-PyPy-β-HpPy
367β)	5'-W G A T A G W-3'	ImPy-β-PyIm-γ-PyHpPyHpPy
367βp)	5'-W G A T A G W-3'	ImPy-β-PyIm-γ-PyHp-β-HpPy
369β)	5'-W G A T G T W-3'	ImPy-β-ImHp-γ-PyPyPyHpPy
369βp)	5'-W G A T G T W-3'	ImPy-β-ImHp-γ-PyPy-β-HpPy
370β)	5'-W G A T G A W-3'	ImPy-β-ImPy-γ-HpPyPyHpPy
370βp)	5'-W G A T G A W-3'	ImPy-β-ImPy-γ-HpPy-β-HpPy
371β)	5'-W G A T G G W-3'	ImPy-β-ImIm-γ-PyPyPyHpPy
371βp)	5'-W G A T G G W-3'	ImPy-β-ImIm-γ-PyPy-β-HpPy
372β)	5'-W G A T G C W-3'	ImPy-β-ImPy-γ-ImPyPyHpPy
372βp)	5'-W G A T G C W-3'	ImPy-β-ImPy-γ-ImPy-β-HpPy
375β)	5'-W G A T C G W-3'	ImPy-β-PyIm-γ-PyImPyHpPy
375βp)	5'-W G A T C G W-3'	ImPy-β-PyIm-γ-PyIm-β-HpPy
379β)	5'-W G A A T G W-3'	ImPy-β-HpIm-γ-PyPyHpHpPy
379βp)	5'-W G A A T G W-3'	ImPy-β-HpIm-γ-PyPy-β-HpPy
383β)	5'-W G A A A G W-3'	ImPy-β-PyIm-γ-PyHpHpHpPy
383βp)	5'-W G A A A G W-3'	ImPy-β-PyIm-γ-PyHp-β-HpPy
385β)	5'-W G A A G T W-3'	ImPy-β-ImHp-γ-PyPyHpHpPy
385βp)	5'-W G A A G T W-3'	ImPy-β-ImHp-γ-PyPy-β-HpPy
386β)	5'-W G A A G A W-3'	ImPy-β-ImPy-γ-HpPyHpHpPy
386βp)	5'-W G A A G A W-3'	ImPy-β-ImPy-γ-HpPy-β-HpPy
387β)	5'-W G A A G G W-3'	ImPy-β-ImIm-γ-PyPyHpHpPy
387βp)	5'-W G A A G G W-3'	ImPy-β-ImIm-γ-PyPy-β-HpPy
388β)	5'-W G A A G C W-3'	ImPy-β-ImPy-γ-ImPyHpHpPy
388βp)	5'-W G A A G C W-3'	ImPy-β-ImPy-γ-ImPy-β-HpPy
391β)	5'-W G A A C G W-3'	ImPy-β-PyIm-γ-PyImHpHpPy
391βp)	5'-W G A A C G W-3'	ImPy-β-PyIm-γ-PyIm-β-HpPy

TABLE 57: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
393β)	5'-W G A G T T W-3'	Im-β-ImHpHp-γ-PyPyPyHpPy
394βp)	5'-W G A G T A W-3'	Im-β-ImHpPy-γ-HpPyPy-β-Py
395β)	5'-W G A G T G W-3'	Im-β-ImHpIm-γ-PyPyPyHpPy
395βp)	5'-W G A G T G W-3'	Im-β-ImHpIm-γ-PyPyPy-β-Py
396β)	5'-W G A G T C W-3'	Im-β-ImHpPy-γ-ImPyPyHpPy
396βp)	5'-W G A G T C W-3'	Im-β-ImHpPy-γ-ImPyPy-β-Py
397β)	5'-W G A G A T W-3'	Im-β-ImPyHp-γ-PyHpPyHpPy
397βp)	5'-W G A G A T W-3'	Im-β-ImPyHp-γ-PyHpPy-β-Py
398β)	5'-W G A G A A W-3'	Im-β-ImPyPy-γ-HpHpPyHpPy
398βp)	5'-W G A G A A W-3'	Im-β-ImPyPy-γ-HpHpPy-β-Py
399β)	5'-W G A G A G W-3'	Im-β-ImPyIm-γ-PyHpPyHpPy
399βp)	5'-W G A G A G W-3'	Im-β-ImPyIm-γ-PyHpPy-β-Py
400β)	5'-W G A G A C W-3'	Im-β-ImPyPy-γ-ImHpPyHpPy
400βp)	5'-W G A G A C W-3'	Im-β-ImPyPy-γ-ImHpPy-β-Py
401β)	5'-W G A G G T W-3'	Im-β-ImImHp-γ-PyPyPyHpPy
401βp)	5'-W G A G G T W-3'	Im-β-ImImHp-γ-PyPyPy-β-Py
402β)	5'-W G A G G A W-3'	Im-β-ImImPy-γ-HpPyPyHpPy
402βp)	5'-W G A G G A W-3'	Im-β-ImImPy-γ-HpPyPy-β-Py
403β)	5'-W G A G C T W-3'	Im-β-ImPyHp-γ-PyImPyHpPy
403βp)	5'-W G A G C T W-3'	Im-β-ImPyHp-γ-PyImPy-β-Py
404β)	5'-W G A G C A W-3'	Im-β-ImPyPy-γ-HpImPyHpPy
404βp)	5'-W G A G C A W-3'	Im-β-ImPyPy-γ-HpImPy-β-Py
405β)	5'-W G A G G G W-3'	Im-β-ImImIm-γ-PyPyPyHpPy
405βp)	5'-W G A G G G W-3'	Im-β-ImImIm-γ-PyPyPy-β-Py
406β)	5'-W G A G G C W-3'	Im-β-ImImPy-γ-ImPyPyHpPy
406βp)	5'-W G A G G C W-3'	Im-β-ImImPy-γ-ImPyPy-β-Py
407β)	5'-W G A G C G W-3'	Im-β-ImPyIm-γ-PyImPyHpPy
407βp)	5'-W G A G C G W-3'	Im-β-ImPyIm-γ-PyImPy-β-Py
408β)	5'-W G A G C C W-3'	Im-β-ImPyPy-γ-ImImPyHpPy
408βp)	5'-W G A G C C W-3'	Im-β-ImPyPy-γ-ImImPy-β-Py

TABLE 57 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
409β)	5'-W G A C T T W-3'	ImPyPyHpHp-γ-Py-β-ImHpPy
409βp)	5'-W G A C T T W-3'	ImPyPy-β-Hp-γ-Py-β-ImHpPy
410β)	5'-W G A C T A W-3'	ImPyPyHpPy-γ-Hp-β-ImHpPy
410βp)	5'-W G A C T A W-3'	ImPyPy-β-Py-γ-Hp-β-ImHpPy
411β)	5'-W G A C T G W-3'	ImPy-β-HpIm-γ-Py-β-ImHpPy
412β)	5'-W G A C T C W-3'	ImPyPyHpPy-γ-Im-β-ImHpPy
412βp)	5'-W G A C T C W-3'	ImPyPy-β-Py-γ-Im-β-ImHpPy
413β)	5'-W G A C A T W-3'	ImPyPyPyHp-γ-Py-β-ImHpPy
413βp)	5'-W G A C A T W-3'	ImPyPy-β-Hp-γ-Py-β-ImHpPy
414β)	5'-W G A C A A W-3'	ImPyPyPyPy-γ-Hp-β-ImHpPy
414βp)	5'-W G A C A A W-3'	ImPyPy-β-Py-γ-Hp-β-ImHpPy
415β)	5'-W G A C A G W-3'	ImPy-β-PyIm-γ-Py-β-ImHpPy
416β)	5'-W G A C A C W-3'	ImPyPyPyPy-γ-Im-β-ImHpPy
416βp)	5'-W G A C A C W-3'	ImPyPy-β-Py-γ-Im-β-ImHpPy
417β)	5'-W G A C G T W-3'	ImPy-β-ImHp-γ-Py-β-ImHpPy
418β)	5'-W G A C G A W-3'	ImPy-β-ImPy-γ-Hp-β-ImHpPy
419β)	5'-W G A C C T W-3'	Im-β-PyPyHp-γ-PyImIm-β-Py
419βp)	5'-W G A C C T W-3'	ImPyPyPyHp-γ-PyImIm-β-Py
420β)	5'-W G A C C A W-3'	Im-β-PyPyPy-γ-HpImIm-β-Py
420βp)	5'-W G A C C A W-3'	ImPyPyPyPy-γ-HpImIm-β-Py
421β)	5'-W G A C G G W-3'	ImPy-β-ImIm-γ-Py-β-ImHpPy
422β)	5'-W G A C G C W-3'	ImPy-β-ImPy-γ-Im-β-ImHpPy
423β)	5'-W G A C C G W-3'	ImPy-β-PyIm-γ-PyImIm-β-Py
424β)	5'-W G A C C C W-3'	ImPyPyPyPy-γ-ImImIm-β-Py
424βp)	5'-W G A C C C W-3'	Im-β-PyPyPy-γ-ImImIm-β-Py

TABLE 58: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
425β)	5'-W G C T T T W-3'	ImPyHpHpHp-γ-PyPy-β-ImPy
425βp)	5'-W G C T T T W-3'	ImPy-β-HpHp-γ-PyPy-β-ImPy
426β)	5'-W G C T T A W-3'	ImPyHpHpPy-γ-HpPy-β-ImPy
426βp)	5'-W G C T T A W-3'	ImPy-β-HpPy-γ-HpPy-β-ImPy
427β)	5'-W G C T T G W-3'	ImPy-β-HpIm-γ-PyPy-β-ImPy
428β)	5'-W G C T T C W-3'	ImPyHpHpPy-γ-ImPy-β-ImPy
428βp)	5'-W G C T T C W-3'	ImPy-β-HpPy-γ-ImPy-β-ImPy
429β)	5'-W G C T A T W-3'	ImPyHpPyHp-γ-PyHp-β-ImPy
429βp)	5'-W G C T A T W-3'	ImPy-β-PyHp-γ-PyHp-β-ImPy
430β)	5'-W G C T A A W-3'	ImPyHpPyPy-γ-HpHp-β-ImPy
430βp)	5'-W G C T A A W-3'	ImPy-β-PyPy-γ-HpHp-β-ImPy
431β)	5'-W G C T A G W-3'	ImPy-β-PyIm-γ-PyHp-β-ImPy
432β)	5'-W G C T A C W-3'	ImPyHpPyPy-γ-ImHp-β-ImPy
432βp)	5'-W G C T A C W-3'	ImPy-β-PyPy-γ-ImHp-β-ImPy
433β)	5'-W G C T G T W-3'	ImPy-β-ImHp-γ-PyPy-β-ImPy
434β)	5'-W G C T G A W-3'	ImPy-β-ImPy-γ-HpPy-β-ImPy
435β)	5'-W G C T G G W-3'	ImPy-β-ImIm-γ-PyPy-β-ImPy
436β)	5'-W G C T G C W-3'	ImPy-β-ImPy-γ-ImPy-β-ImPy
437β)	5'-W G C T C T W-3'	ImPyHpPyHp-γ-PyIm-β-ImPy
437βp)	5'-W G C T C T W-3'	ImPy-β-PyHp-γ-PyIm-β-ImPy
438β)	5'-W G C T C A W-3'	ImPyHpPyPy-γ-HpIm-β-ImPy
438βp)	5'-W G C T C A W-3'	ImPy-β-PyPy-γ-HpIm-β-ImPy
439β)	5'-W G C T C G W-3'	ImPy-β-PyIm-γ-PyIm-β-ImPy
440β)	5'-W G C T C C W-3'	ImPyHpPyPy-γ-ImIm-β-ImPy
440βp)	5'-W G C T C C W-3'	ImPy-β-PyPy-γ-ImIm-β-ImPy
441β)	5'-W G C A T T W-3'	ImPyPyHpHp-γ-PyPy-β-ImPy
441βp)	5'-W G C A T T W-3'	ImPy-β-HpHp-γ-PyPy-β-ImPy
442β)	5'-W G C A T A W-3'	ImPyPyHpPy-γ-HpPy-β-ImPy
442βp)	5'-W G C A T A W-3'	ImPy-β-HpPy-γ-HpPy-β-ImPy
443β)	5'-W G C A T G W-3'	ImPy-β-HpIm-γ-PyPy-β-ImPy

TABLE 58 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
444β)	5'-W G C A T C W-3'	ImPyPyHpPy-γ-ImPy-β-ImPy
444βp)	5'-W G C A T C W-3'	ImPy-β-HpPy-γ-ImPy-β-ImPy
445β)	5'-W G C A A T W-3'	ImPyPyPyHp-γ-PyHp-β-ImPy
445βp)	5'-W G C A A T W-3'	ImPy-β-PyHp-γ-PyHp-β-ImPy
446β)	5'-W G C A A A W-3'	ImPyPyPyPy-γ-HpHp-β-ImPy
446βp)	5'-W G C A A A W-3'	ImPy-β-PyPy-γ-HpHp-β-ImPy
447β)	5'-W G C A A G W-3'	ImPy-β-PyIm-γ-PyHp-β-ImPy
448β)	5'-W G C A A C W-3'	ImPyPyPyPy-γ-ImHp-β-ImPy
448βp)	5'-W G C A A C W-3'	ImPy-β-PyPy-γ-ImHp-β-ImPy
449β)	5'-W G C A G T W-3'	ImPy-β-ImHp-γ-PyPy-β-ImPy
450β)	5'-W G C A G A W-3'	ImPy-β-ImPy-γ-HpPy-β-ImPy
451β)	5'-W G C A G G W-3'	ImPy-β-ImIm-γ-PyPy-β-ImPy
452β)	5'-W G C A G C W-3'	ImPy-β-ImPy-γ-ImPy-β-ImPy
453β)	5'-W G C A C T W-3'	ImPyPyPyHp-γ-PyIm-β-ImPy
453βp)	5'-W G C A C T W-3'	ImPy-β-PyHp-γ-PyIm-β-ImPy
454β)	5'-W G C A C A W-3'	ImPyPyPyPy-γ-HpIm-β-ImPy
454βp)	5'-W G C A C A W-3'	ImPy-β-PyPy-γ-HpIm-β-ImPy
455β)	5'-W G C A C G W-3'	ImPy-β-PyIm-γ-PyIm-β-ImPy
456β)	5'-W G C A C C W-3'	ImPyPyPyPy-γ-ImIm-β-ImPy
456βp)	5'-W G C A C C W-3'	ImPy-β-PyPy-γ-ImIm-β-ImPy

TABLE 59: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
457β)	5'-W G C G T T W-3'	Im-β-ImHpHp-γ-PyPy-β-ImPy
458β)	5'-W G C G T A W-3'	Im-β-ImHpPy-γ-HpPy-β-ImPy
459β)	5'-W G C G T G W-3'	Im-β-ImHpIm-γ-PyPy-β-ImPy
460β)	5'-W G C G T C W-3'	Im-β-ImHpPy-γ-ImPy-β-ImPy
461β)	5'-W G C G A T W-3'	Im-β-ImPyHp-γ-PyHp-β-ImPy
462β)	5'-W G C G A A W-3'	Im-β-ImPyPy-γ-HpHp-β-ImPy
463β)	5'-W G C G A G W-3'	Im-β-ImPyIm-γ-PyHp-β-ImPy
464β)	5'-W G C G A C W-3'	Im-β-ImPyPy-γ-ImHp-β-ImPy
465β)	5'-W G C G G T W-3'	Im-β-ImImHp-γ-PyPy-β-ImPy
466β)	5'-W G C G G A W-3'	Im-β-ImImPy-γ-HpPy-β-ImPy
467β)	5'-W G C G C T W-3'	Im-β-ImPyHp-γ-PyIm-β-ImPy
468β)	5'-W G C G C A W-3'	Im-β-ImPyPy-γ-HpIm-β-ImPy
469β)	5'-W G C C T T W-3'	ImPyPyHpHp-γ-Py-β-ImImPy
469βp)	5'-W G C C T T W-3'	ImPyPy-β-Hp-γ-Py-β-ImImPy
470β)	5'-W G C C T A W-3'	ImPyPyHpPy-γ-Hp-β-ImImPy
470βp)	5'-W G C C T A W-3'	ImPyPy-β-Py-γ-Hp-β-ImImPy
471β)	5'-W G C C T G W-3'	ImPy-β-HpIm-γ-Py-β-ImImPy
472β)	5'-W G C C T C W-3'	ImPyPyHpPy-γ-Im-β-ImImPy
472βp)	5'-W G C C T C W-3'	ImPyPy-β-Py-γ-Im-β-ImImPy
473β)	5'-W G C C A T W-3'	ImPyPyPyHp-γ-Py-β-ImImPy
473βp)	5'-W G C C A T W-3'	ImPyPy-β-Hp-γ-Py-β-ImImPy
474β)	5'-W G C C A A W-3'	ImPyPyPyPy-γ-Hp-β-ImImPy
474βp)	5'-W G C C A A W-3'	ImPyPy-β-Py-γ-Hp-β-ImImPy
475β)	5'-W G C C A G W-3'	ImPy-β-PyIm-γ-Py-β-ImImPy
476β)	5'-W G C C A C W-3'	ImPyPyPyPy-γ-Im-β-ImImPy
476βp)	5'-W G C C A C W-3'	ImPyPy-β-Py-γ-Im-β-ImImPy
477β)	5'-W G C C G T W-3'	ImPy-β-ImHp-γ-Py-β-ImImPy
478β)	5'-W G C C G A W-3'	ImPy-β-ImPy-γ-Hp-β-ImImPy

TABLE 59 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
G25β)	5'-W G C G G G W-3'	Im-β-ImImIm-γ-PyPy-β-ImPy
G26β)	5'-W G C G G C W-3'	Im-β-ImImPy-γ-ImPy-β-ImPy
G27β)	5'-W G C G C G W-3'	Im-β-ImPyIm-γ-PyIm-β-ImPy
G28β)	5'-W G C G C C W-3'	Im-β-ImPyPy-γ-ImIm-β-ImPy
G29β)	5'-W G C C G G W-3'	ImPy-β-ImIm-γ-Py-β-ImImPy
G30β)	5'-W G C C G C W-3'	ImPy-β-ImPy-γ-Im-β-ImImPy
G31β)	5'-W G C C C G W-3'	ImPy-β-PyIm-γ-PyImImImPy

TABLE 60: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
481β)	5'-W C G T T T W-3'	PyImHpHpHp-γ-PyPy-β-PyIm
481βp)	5'-W C G T T T W-3'	PyIm-β-HpHp-γ-PyPy-β-PyIm
482β)	5'-W C G T T A W-3'	PyImHpHpPy-γ-HpPy-β-PyIm
482βp)	5'-W C G T T A W-3'	PyIm-β-HpPy-γ-HpPy-β-PyIm
483β)	5'-W C G T T G W-3'	PyIm-β-HpIm-γ-PyPy-β-PyIm
484β)	5'-W C G T T C W-3'	PyImHpHpPy-γ-ImPy-β-PyIm
484βp)	5'-W C G T T C W-3'	PyIm-β-HpPy-γ-ImPy-β-PyIm
485β)	5'-W C G T A T W-3'	PyImHpPyHp-γ-PyHp-β-PyIm
485βp)	5'-W C G T A T W-3'	PyIm-β-PyHp-γ-PyHp-β-PyIm
486β)	5'-W C G T A A W-3'	PyImHpPyPy-γ-HpHp-β-PyIm
486βp)	5'-W C G T A A W-3'	PyIm-β-PyPy-γ-HpHp-β-PyIm
487β)	5'-W C G T A G W-3'	PyIm-β-PyIm-γ-PyHp-β-PyIm
488β)	5'-W C G T A C W-3'	PyImHpPyPy-γ-ImHp-β-PyIm
488βp)	5'-W C G T A C W-3'	PyIm-β-PyPy-γ-ImHp-β-PyIm
489β)	5'-W C G T G T W-3'	PyIm-β-ImHp-γ-PyPy-β-PyIm
490β)	5'-W C G T G A W-3'	PyIm-β-ImPy-γ-HpPy-β-PyIm
491β)	5'-W C G T G G W-3'	PyIm-β-ImIm-γ-PyPy-β-PyIm
492β)	5'-W C G T G C W-3'	PyIm-β-ImPy-γ-ImPy-β-PyIm
493β)	5'-W C G T C T W-3'	PyImHpPyHp-γ-PyIm-β-PyIm
493βp)	5'-W C G T C T W-3'	PyIm-β-PyHp-γ-PyIm-β-PyIm
494β)	5'-W C G T C A W-3'	PyImHpPyPy-γ-HpIm-β-PyIm
494βp)	5'-W C G T C A W-3'	PyIm-β-PyPy-γ-HpIm-β-PyIm
495β)	5'-W C G T C G W-3'	PyIm-β-PyIm-γ-PyIm-β-PyIm
496β)	5'-W C G T C C W-3'	PyImHpPyPy-γ-ImIm-β-PyIm
496βp)	5'-W C G T C C W-3'	PyIm-β-PyPy-γ-ImIm-β-PyIm
497β)	5'-W C G A T T W-3'	PyImPyHpHp-γ-PyPy-β-PyIm
497βp)	5'-W C G A T T W-3'	PyIm-β-HpHp-γ-PyPy-β-PyIm
498β)	5'-W C G A T A W-3'	PyImPyHpPy-γ-HpPy-β-PyIm
498βp)	5'-W C G A T A W-3'	PyIm-β-HpPy-γ-HpPy-β-PyIm

TABLE 60 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
499β)	5'-W C G A T G W-3'	PyIm-β-HpIm-γ-PyPy-β-PyIm
500β)	5'-W C G A T C W-3'	PyImPyHpPy-γ-ImPy-β-PyIm
500βp)	5'-W C G A T C W-3'	PyIm-β-HpPy-γ-ImPy-β-PyIm
501β)	5'-W C G A A T W-3'	PyImPyPyHp-γ-PyHp-β-PyIm
501βp)	5'-W C G A A T W-3'	PyIm-β-PyHp-γ-PyHp-β-PyIm
502β)	5'-W C G A A A W-3'	PyImPyPyPy-γ-HpHp-β-PyIm
502βp)	5'-W C G A A A W-3'	PyIm-β-PyPy-γ-HpHp-β-PyIm
503β)	5'-W C G A A G W-3'	PyIm-β-PyIm-γ-PyHp-β-PyIm
504β)	5'-W C G A A C W-3'	PyImPyPyPy-γ-ImHp-β-PyIm
504βp)	5'-W C G A A C W-3'	PyIm-β-PyPy-γ-ImHp-β-PyIm
505β)	5'-W C G A G T W-3'	PyIm-β-ImHp-γ-PyPy-β-PyIm
506β)	5'-W C G A G A W-3'	PyIm-β-ImPy-γ-HpPy-β-PyIm
507β)	5'-W C G A G G W-3'	PyIm-β-ImIm-γ-PyPy-β-PyIm
508β)	5'-W C G A G C W-3'	PyIm-β-ImPy-γ-ImPy-β-PyIm
509β)	5'-W C G A C T W-3'	PyImPyPyHp-γ-PyIm-β-PyIm
509βp)	5'-W C G A C T W-3'	PyIm-β-PyHp-γ-PyIm-β-PyIm
510β)	5'-W C G A C A W-3'	PyImPyPyPy-γ-HpIm-β-PyIm
510βp)	5'-W C G A C A W-3'	PyIm-β-PyPy-γ-HpIm-β-PyIm
511β)	5'-W C G A C G W-3'	PyIm-β-PyIm-γ-PyIm-β-PyIm
512β)	5'-W C G A C C W-3'	PyImPyPyPy-γ-ImIm-β-PyIm
512βp)	5'-W C G A C C W-3'	PyIm-β-PyPy-γ-ImIm-β-PyIm

TABLE 61: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
513β)	5'-W C G G T T W-3'	PyImIm-β-Hp-γ-PyPy-β-PyIm
514β)	5'-W C G G T A W-3'	PyImIm-β-Py-γ-HpPy-β-PyIm
515β)	5'-W C G G T G W-3'	PyImIm-β-Im-γ-PyPy-β-PyIm
516β)	5'-W C G G T C W-3'	PyImIm-β-Py-γ-ImPy-β-PyIm
517β)	5'-W C G G A T W-3'	PyImIm-β-Hp-γ-PyHp-β-PyIm
518β)	5'-W C G G A A W-3'	PyImIm-β-Py-γ-HpHp-β-PyIm
519β)	5'-W C G G A G W-3'	PyImIm-β-Im-γ-PyHp-β-PyIm
520β)	5'-W C G G A C W-3'	PyImIm-β-Py-γ-ImHp-β-PyIm
521β)	5'-W C G G G T W-3'	PyImImImHp-γ-PyPy-β-PyIm
522β)	5'-W C G G G A W-3'	PyImImImPy-γ-HpPy-β-PyIm
523β)	5'-W C G G C T W-3'	PyImIm-β-Hp-γ-PyIm-β-PyIm
524β)	5'-W C G G C A W-3'	PyImIm-β-Py-γ-HpIm-β-PyIm
525β)	5'-W C G C T T W-3'	PyImPyHpHp-γ-Py-β-ImPyIm
525βp)	5'-W C G C T T W-3'	PyImPy-β-Hp-γ-Py-β-ImPyIm
526β)	5'-W C G C T A W-3'	PyImPyHpPy-γ-Hp-β-ImPyIm
526βp)	5'-W C G C T A W-3'	PyImPy-β-Py-γ-Hp-β-ImPyIm
527β)	5'-W C G C T G W-3'	PyIm-β-HpIm-γ-Py-β-ImPyIm
528β)	5'-W C G C T C W-3'	PyImPyHpPy-γ-Im-β-ImPyIm
528βp)	5'-W C G C T C W-3'	PyImPy-β-Py-γ-Im-β-ImPyIm
529β)	5'-W C G C A T W-3'	PyImPyPyHp-γ-Py-β-ImPyIm
529βp)	5'-W C G C A T W-3'	PyImPy-β-Hp-γ-Py-β-ImPyIm
530β)	5'-W C G C A A W-3'	PyImPyPyPy-γ-Hp-β-ImPyIm
530βp)	5'-W C G C A A W-3'	PyImPy-β-Py-γ-Hp-β-ImPyIm
531β)	5'-W C G C A G W-3'	PyIm-β-PyIm-γ-Py-β-ImPyIm
532β)	5'-W C G C A C W-3'	PyImPyPyPy-γ-Im-β-ImPyIm
532βp)	5'-W C G C A C W-3'	PyImPy-β-Py-γ-Im-β-ImPyIm
533β)	5'-W C G C G T W-3'	PyIm-β-ImHp-γ-Py-β-ImPyIm
534β)	5'-W C G C G A W-3'	PyIm-β-ImPy-γ-Hp-β-ImPyIm

TABLE 61 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
535β)	5'-W C G C C T W-3'	PyImPyPyHp-γ-PyImIm-β-Im
536β)	5'-W C G C C A W-3'	PyImPyPyPy-γ-HpImIm-β-Im
G33β)	5'-W C G G G G W-3'	PyImImImIm-γ-PyPy-β-PyIm
G34β)	5'-W C G G G C W-3'	PyImImImPy-γ-ImPy-β-PyIm
G35β)	5'-W C G G C G W-3'	PyImIm-β-Im-γ-PyIm-β-PyIm
G36β)	5'-W C G G C C W-3'	PyImIm-β-Py-γ-ImIm-β-PyIm
G37β)	5'-W C G C G G W-3'	PyIm-β-ImIm-γ-Py-β-ImPyIm
G38β)	5'-W C G C G C W-3'	PyIm-β-ImPy-γ-Im-β-ImPyIm
G39β)	5'-W C G C C G W-3'	PyIm-β-PyIm-γ-PyImIm-β-Im
G40β)	5'-W C G C C C W-3'	PyImPyPyPy-γ-ImImIm-β-Im

TABLE 62: 10-ring Hairpin Polyamides for recognition of 7-bp 5`-WCTWNNW-3` with β substitutions.

	DNA sequence	aromatic amino acid sequence
537β)	5'-W C T T T T W-3'	PyHpHpHpHp-γ-PyPy-β-PyIm
537βp)	5'-W C T T T T W-3'	PyHp-β-HpHp-γ-PyPy-β-PyIm
538β)	5'-W C T T T A W-3'	PyHpHpHpPy-γ-HpPy-β-PyIm
538βp)	5'-W C T T T A W-3'	PyHp-β-HpPy-γ-HpPy-β-PyIm
539β)	5'-W C T T T G W-3'	PyHp-β-HpIm-γ-PyPy-β-PyIm
540β)	5'-W C T T T C W-3'	PyHpHpHpPy-γ-ImPy-β-PyIm
540βp)	5'-W C T T T C W-3'	PyHp-β-HpPy-γ-ImPy-β-PyIm
541β)	5'-W C T T A T W-3'	PyHpHpPyHp-γ-PyHp-β-PyIm
541βp)	5'-W C T T A T W-3'	PyHp-β-PyHp-γ-PyHp-β-PyIm
542β)	5'-W C T T A A W-3'	PyHpHpPyPy-γ-HpHp-β-PyIm
542βp)	5'-W C T T A A W-3'	PyHp-β-PyPy-γ-HpHp-β-PyIm
543β)	5'-W C T T A G W-3'	PyHp-β-PyIm-γ-PyHp-β-PyIm
544β)	5'-W C T T A C W-3'	PyHpHpPyPy-γ-ImHp-β-PyIm
544βp)	5'-W C T T A C W-3'	PyHp-β-PyPy-γ-ImHp-β-PyIm
545β)	5'-W C T T G T W-3'	PyHp-β-ImHp-γ-PyPy-β-PyIm
546β)	5'-W C T T G A W-3'	PyHp-β-ImPy-γ-HpPy-β-PyIm
547β)	5'-W C T T G G W-3'	PyHp-β-ImIm-γ-PyPy-β-PyIm
548β)	5'-W C T T G C W-3'	PyHp-β-ImPy-γ-ImPy-β-PyIm
549β)	5'-W C T T C T W-3'	PyHpHpPyHp-γ-PyIm-β-PyIm
549βp)	5'-W C T T C T W-3'	PyHp-β-PyHp-γ-PyIm-β-PyIm
550β)	5'-W C T T C A W-3'	PyHpHpPyPy-γ-HpIm-β-PyIm
550βp)	5'-W C T T C A W-3'	PyHp-β-PyPy-γ-HpIm-β-PyIm
551β)	5'-W C T T C G W-3'	PyHp-β-PyIm-γ-PyIm-β-PyIm
552β)	5'-W C T T C C W-3'	PyHpHpPyPy-γ-ImIm-β-PyIm
552βp)	5'-W C T T C C W-3'	PyHp-β-PyPy-γ-ImIm-β-PyIm
553β)	5'-W C T A T T W-3'	PyHpPyHpHp-γ-PyPy-β-PyIm
553βp)	5'-W C T A T T W-3'	PyHp-β-HpHp-γ-PyPy-β-PyIm
554β)	5'-W C T A T A W-3'	PyHpPyHpPy-γ-HpPy-β-PyIm

TABLE 62 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
554βp)	5'-W C T A T A W-3'	PyHp-β-HpPy-γ-HpPy-β-PyIm
555β)	5'-W C T A T G W-3'	PyHp-β-HpIm-γ-PyPy-β-PyIm
556β)	5'-W C T A T C W-3'	PyHpPyHpPy-γ-ImPy-β-PyIm
556βp)	5'-W C T A T C W-3'	PyHp-β-HpPy-γ-ImPy-β-PyIm
557β)	5'-W C T A A T W-3'	PyHpPyPyHp-γ-PyHp-β-PyIm
557βp)	5'-W C T A A T W-3'	PyHp-β-PyHp-γ-PyHp-β-PyIm
558β)	5'-W C T A A A W-3'	PyHpPyPyPy-γ-HpHp-β-PyIm
558βp)	5'-W C T A A A W-3'	PyHp-β-PyPy-γ-HpHp-β-PyIm
559β)	5'-W C T A A G W-3'	PyHp-β-PyIm-γ-PyHp-β-PyIm
560β)	5'-W C T A A C W-3'	PyHpPyPyPy-γ-ImHp-β-PyIm
560βp)	5'-W C T A A C W-3'	PyHp-β-PyPy-γ-ImHp-β-PyIm
561β)	5'-W C T A G T W-3'	PyHp-β-ImHp-γ-PyPy-β-PyIm
562β)	5'-W C T A G A W-3'	PyHp-β-ImPy-γ-HpPy-β-PyIm
563β)	5'-W C T A G G W-3'	PyHp-β-ImIm-γ-PyPy-β-PyIm
564β)	5'-W C T A G C W-3'	PyHp-β-ImPy-γ-ImPy-β-PyIm
565β)	5'-W C T A C T W-3'	PyHpPyPyHp-γ-PyIm-β-PyIm
565βp)	5'-W C T A C T W-3'	PyHp-β-PyHp-γ-PyIm-β-PyIm
566β)	5'-W C T A C A W-3'	PyHpPyPyPy-γ-HpIm-β-PyIm
566βp)	5'-W C T A C A W-3'	PyHp-β-PyPy-γ-HpIm-β-PyIm
567β)	5'-W C T A C G W-3'	PyHp-β-PyIm-γ-PyIm-β-PyIm
568β)	5'-W C T A C C W-3'	PyHpPyPyPy-γ-ImIm-β-PyIm
568βp)	5'-W C T A C C W-3'	PyHp-β-PyPy-γ-ImIm-β-PyIm

TABLE 63: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
569β)	5'-W C T G T T W-3'	Py-β-ImHpHp-γ-PyPy-β-PyIm
570β)	5'-W C T G T A W-3'	Py-β-ImHpPy-γ-HpPy-β-PyIm
571β)	5'-W C T G T G W-3'	Py-β-ImHpIm-γ-PyPy-β-PyIm
572β)	5'-W C T G T C W-3'	Py-β-ImHpPy-γ-ImPy-β-PyIm
573β)	5'-W C T G A T W-3'	Py-β-ImPyHp-γ-PyHp-β-PyIm
574β)	5'-W C T G A A W-3'	Py-β-ImPyPy-γ-HpHp-β-PyIm
575β)	5'-W C T G A G W-3'	Py-β-ImPyIm-γ-PyHp-β-PyIm
576β)	5'-W C T G A C W-3'	Py-β-ImPyPy-γ-ImHp-β-PyIm
577β)	5'-W C T G G T W-3'	Py-β-ImImHp-γ-PyPy-β-PyIm
578β)	5'-W C T G G A W-3'	Py-β-ImImPy-γ-HpPy-β-PyIm
579β)	5'-W C T G C T W-3'	Py-β-ImPyHp-γ-PyIm-β-PyIm
580β)	5'-W C T G C A W-3'	Py-β-ImPyPy-γ-HpIm-β-PyIm
581β)	5'-W C T G G G W-3'	Py-β-ImImIm-γ-PyPy-β-PyIm
582β)	5'-W C T G G C W-3'	Py-β-ImImPy-γ-ImPy-β-PyIm
583β)	5'-W C T G C G W-3'	Py-β-ImPyIm-γ-PyIm-β-PyIm
584β)	5'-W C T G C C W-3'	Py-β-ImPyPy-γ-ImIm-β-PyIm
585β)	5'-W C T C T T W-3'	PyHpPyHpHp-γ-Py-β-ImPyIm
585βp)	5'-W C T C T T W-3'	PyHpPy-β-Hp-γ-Py-β-ImPyIm
586β)	5'-W C T C T A W-3'	PyHpPyHpPy-γ-Hp-β-ImPyIm
586βp)	5'-W C T C T A W-3'	PyHpPy-β-Py-γ-Hp-β-ImPyIm
587β)	5'-W C T C T G W-3'	PyHp-β-HpIm-γ-Py-β-ImPyIm
588β)	5'-W C T C T C W-3'	PyHpPyHpPy-γ-Im-β-ImPyIm
588βp)	5'-W C T C T C W-3'	PyHpPy-β-Py-γ-Im-β-ImPyIm
589β)	5'-W C T C A T W-3'	PyHpPyPyHp-γ-Py-β-ImPyIm
589βp)	5'-W C T C A T W-3'	PyHpPy-β-Hp-γ-Py-β-ImPyIm
590β)	5'-W C T C A A W-3'	PyHpPyPyPy-γ-Hp-β-ImPyIm
590βp)	5'-W C T C A A W-3'	PyHpPy-β-Py-γ-Hp-β-ImPyIm
591β)	5'-W C T C A G W-3'	PyHp-β-PyIm-γ-Py-β-ImPyIm

TABLE 63 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
592β)	5'-W C T C A C W-3'	PyHpPyPyPy-γ-Im-β-ImPyIm
592βp)	5'-W C T C A C W-3'	PyHpPy-β-Py-γ-Im-β-ImPyIm
593β)	5'-W C T C G T W-3'	PyHp-β-ImHp-γ-Py-β-ImPyIm
594β)	5'-W C T C G A W-3'	PyHp-β-ImPy-γ-Hp-β-ImPyIm
595β)	5'-W C T C C T W-3'	PyHpPyPyHp-γ-PyImIm-β-Im
595βp)	5'-W C T C C T W-3'	Py-β-PyPyHp-γ-PyImIm-β-Im
596β)	5'-W C T C C A W-3'	PyHpPyPyPy-γ-HpImIm-β-Im
596βp)	5'-W C T C C A W-3'	Py-β-PyPyPy-γ-HpImIm-β-Im
597β)	5'-W C T C G G W-3'	PyHp-β-ImIm-γ-Py-β-ImPyIm
598β)	5'-W C T C G C W-3'	PyHp-β-ImPy-γ-Im-β-ImPyIm
599β)	5'-W C T C C G W-3'	PyHp-β-PyIm-γ-PyImIm-β-Im
600β)	5'-W C T C C C W-3'	PyHpPyPyPy-γ-ImImIm-β-Im
600βp)	5'-W C T C C C W-3'	Py-β-PyPyPy-γ-ImImIm-β-Im

TABLE 64: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCAWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
601β)	5'-W C A T T T W-3'	PyPyHpHpHp-γ-PyPy-β-HpIm
601βp)	5'-W C A T T T W-3'	PyPy-β-HpHp-γ-PyPy-β-HpIm
602β)	5'-W C A T T A W-3'	PyPyHpHpPy-γ-HpPy-β-HpIm
602βp)	5'-W C A T T A W-3'	PyPy-β-HpPy-γ-HpPy-β-HpIm
603β)	5'-W C A T T G W-3'	PyPy-β-HpIm-γ-PyPy-β-HpIm
604β)	5'-W C A T T C W-3'	PyPyHpHpPy-γ-ImPy-β-HpIm
604βp)	5'-W C A T T C W-3'	PyPy-β-HpPy-γ-ImPy-β-HpIm
605β)	5'-W C A T A T W-3'	PyPyHpPyHp-γ-PyHp-β-HpIm
605βp)	5'-W C A T A T W-3'	PyPy-β-PyHp-γ-PyHp-β-HpIm
606β)	5'-W C A T A A W-3'	PyPyHpPyPy-γ-HpHp-β-HpIm
606βp)	5'-W C A T A A W-3'	PyPy-β-PyPy-γ-HpHp-β-HpIm
607β)	5'-W C A T A G W-3'	PyPy-β-PyIm-γ-PyHp-β-HpIm
608β)	5'-W C A T A C W-3'	PyPyHpPyPy-γ-ImHp-β-HpIm
608βp)	5'-W C A T A C W-3'	PyPy-β-PyPy-γ-ImHp-β-HpIm
609β)	5'-W C A T G T W-3'	PyPy-β-ImHp-γ-PyPy-β-HpIm
610β)	5'-W C A T G A W-3'	PyPy-β-ImPy-γ-HpPy-β-HpIm
611β)	5'-W C A T G G W-3'	PyPy-β-ImIm-γ-PyPy-β-HpIm
612β)	5'-W C A T G C W-3'	PyPy-β-ImPy-γ-ImPy-β-HpIm
613β)	5'-W C A T C T W-3'	PyPyHpPyHp-γ-PyIm-β-HpIm
613βp)	5'-W C A T C T W-3'	PyPy-β-PyHp-γ-PyIm-β-HpIm
614β)	5'-W C A T C A W-3'	PyPyHpPyPy-γ-HpIm-β-HpIm
614βp)	5'-W C A T C A W-3'	PyPy-β-PyPy-γ-HpIm-β-HpIm
615β)	5'-W C A T C G W-3'	PyPy-β-PyIm-γ-PyIm-β-HpIm
616β)	5'-W C A T C C W-3'	PyPyHpPyPy-γ-ImIm-β-HpIm
616βp)	5'-W C A T C C W-3'	PyPy-β-PyPy-γ-ImIm-β-HpIm
617β)	5'-W C A A T T W-3'	PyPyPyHpHp-γ-PyPy-β-HpIm
617βp)	5'-W C A A T T W-3'	PyPy-β-HpHp-γ-PyPy-β-HpIm
618β)	5'-W C A A T A W-3'	PyPyPyHpPy-γ-HpPy-β-HpIm
618βp)	5'-W C A A T A W-3'	PyPy-β-HpPy-γ-HpPy-β-HpIm

TABLE 64 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCAWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
619β)	5'-W C A A T G W-3'	PyPy-β-HpIm-γ-PyPy-β-HpIm
620β)	5'-W C A A T C W-3'	PyPyPyHpPy-γ-ImPy-β-HpIm
620βp)	5'-W C A A T C W-3'	PyPy-β-HpPy-γ-ImPy-β-HpIm
621β)	5'-W C A A A T W-3'	PyPyPyPyHp-γ-PyHp-β-HpIm
621βp)	5'-W C A A A T W-3'	PyPy-β-PyHp-γ-PyHp-β-HpIm
622β)	5'-W C A A A A W-3'	PyPyPyPyPy-γ-HpHp-β-HpIm
622βp)	5'-W C A A A A W-3'	PyPy-β-PyPy-γ-HpHp-β-HpIm
623β)	5'-W C A A A G W-3'	PyPy-β-PyIm-γ-PyHp-β-HpIm
624β)	5'-W C A A A C W-3'	PyPyPyPyPy-γ-ImHp-β-HpIm
624βp)	5'-W C A A A C W-3'	PyPy-β-PyPy-γ-ImHp-β-HpIm
625β)	5'-W C A A G T W-3'	PyPy-β-ImHp-γ-PyPy-β-HpIm
626β)	5'-W C A A G A W-3'	PyPy-β-ImPy-γ-HpPy-β-HpIm
627β)	5'-W C A A G G W-3'	PyPy-β-ImIm-γ-PyPy-β-HpIm
628β)	5'-W C A A G C W-3'	PyPy-β-ImPy-γ-ImPy-β-HpIm
629β)	5'-W C A A C T W-3'	PyPyPyPyHp-γ-PyIm-β-HpIm
629βp)	5'-W C A A C T W-3'	PyPy-β-PyHp-γ-PyIm-β-HpIm
630β)	5'-W C A A C A W-3'	PyPyPyPyPy-γ-HpIm-β-HpIm
630βp)	5'-W C A A C A W-3'	PyPy-β-PyPy-γ-HpIm-β-HpIm
631β)	5'-W C A A C G W-3'	PyPy-β-PyIm-γ-PyIm-β-HpIm
632β)	5'-W C A A C C W-3'	PyPyPyPyPy-γ-ImIm-β-HpIm
632βp)	5'-W C A A C C W-3'	PyPy-β-PyPy-γ-ImIm-β-HpIm

TABLE 65: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
633β)	5'-W C A G T T W-3'	Py-β-ImHpHp-γ-PyPy-β-HpIm
634β)	5'-W C A G T A W-3'	Py-β-ImHpPy-γ-HpPy-β-HpIm
635β)	5'-W C A G T G W-3'	Py-β-ImHpIm-γ-PyPy-β-HpIm
636β)	5'-W C A G T C W-3'	Py-β-ImHpPy-γ-ImPy-β-HpIm
637β)	5'-W C A G A T W-3'	Py-β-ImPyHp-γ-PyHp-β-HpIm
638β)	5'-W C A G A A W-3'	Py-β-ImPyPy-γ-HpHp-β-HpIm
639β)	5'-W C A G A G W-3'	Py-β-ImPyIm-γ-PyHp-β-HpIm
640β)	5'-W C A G A C W-3'	Py-β-ImPyPy-γ-ImHp-β-HpIm
641β)	5'-W C A G G T W-3'	Py-β-ImImHp-γ-PyPy-β-HpIm
642β)	5'-W C A G G A W-3'	Py-β-ImImPy-γ-HpPy-β-HpIm
643β)	5'-W C A G C T W-3'	Py-β-ImPyHp-γ-PyIm-β-HpIm
644β)	5'-W C A G C A W-3'	Py-β-ImPyPy-γ-HpIm-β-HpIm
645β)	5'-W C A G G G W-3'	Py-β-ImImIm-γ-PyPy-β-HpIm
646β)	5'-W C A G G C W-3'	Py-β-ImImPy-γ-ImPy-β-HpIm
647β)	5'-W C A G C G W-3'	Py-β-ImPyIm-γ-PyIm-β-HpIm
648β)	5'-W C A G C C W-3'	Py-β-ImPyPy-γ-ImIm-β-HpIm
649β)	5'-W C A C T T W-3'	PyPyPyHpHp-γ-Py-β-ImHpIm
649βp)	5'-W C A C T T W-3'	PyPyPy-β-Hp-γ-Py-β-ImHpIm
650β)	5'-W C A C T A W-3'	PyPyPyHpPy-γ-Hp-β-ImHpIm
650βp)	5'-W C A C T A W-3'	PyPyPy-β-Py-γ-Hp-β-ImHpIm
651β)	5'-W C A C T G W-3'	PyPy-β-HpIm-γ-Py-β-ImHpIm
652β)	5'-W C A C T C W-3'	PyPyPyHpPy-γ-Im-β-ImHpIm
652βp)	5'-W C A C T C W-3'	PyPyPy-β-Py-γ-Im-β-ImHpIm
653β)	5'-W C A C A T W-3'	PyPyPyPyHp-γ-Py-β-ImHpIm
653βp)	5'-W C A C A T W-3'	PyPyPy-β-Hp-γ-Py-β-ImHpIm
654β)	5'-W C A C A A W-3'	PyPyPyPyPy-γ-Hp-β-ImHpIm
654βp)	5'-W C A C A A W-3'	PyPyPy-β-Py-γ-Hp-β-ImHpIm
655β)	5'-W C A C A G W-3'	PyPy-β-PyIm-γ-Py-β-ImHpIm

TABLE 65 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
656β)	5'-W C A C A C W-3'	PyPyPyPyPy-γ-Im-β-ImHpIm
656βp)	5'-W C A C A C W-3'	PyPyPy-β-Py-γ-Im-β-ImHpIm
657β)	5'-W C A C G T W-3'	PyPy-β-ImHp-γ-Py-β-ImHpIm
658βp)	5'-W C A C G A W-3'	PyPy-β-ImPy-γ-Hp-β-ImHpIm
659β)	5'-W C A C C T W-3'	PyPyPyPyHp-γ-PyImIm-β-Im
659βp)	5'-W C A C C T W-3'	Py-β-PyPyHp-γ-PyImIm-β-Im
660β)	5'-W C A C C A W-3'	PyPyPyPyPy-γ-HpImIm-β-Im
660βp)	5'-W C A C C A W-3'	Py-β-PyPyPy-γ-HpImIm-β-Im
661β)	5'-W C A C G G W-3'	PyPy-β-ImIm-γ-Py-β-ImHpIm
662β)	5'-W C A C G C W-3'	PyPy-β-ImPy-γ-Im-β-ImHpIm
663β)	5'-W C A C C G W-3'	PyPy-β-PyIm-γ-PyImIm-β-Im
664β)	5'-W C A C C C W-3'	PyPyPyPyPy-γ-ImImIm-β-Im
664βp)	5'-W C A C C C W-3'	Py-β-PyPyPy-γ-ImImIm-β-Im

TABLE 66: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
665β)	5'-W C C T T T W-3'	PyPyHpHpHp-γ-PyPy-β-ImIm
665βp)	5'-W C C T T T W-3'	PyPy-β-HpHp-γ-PyPy-β-ImIm
666β)	5'-W C C T T A W-3'	PyPyHpHpPy-γ-HpPy-β-ImIm
666βp)	5'-W C C T T A W-3'	PyPy-β-HpPy-γ-HpPy-β-ImIm
667β)	5'-W C C T T G W-3'	PyPy-β-HpIm-γ-PyPy-β-ImIm
668β)	5'-W C C T T C W-3'	PyPyHpHpPy-γ-ImPy-β-ImIm
668βp)	5'-W C C T T C W-3'	PyPy-β-HpPy-γ-ImPy-β-ImIm
669β)	5'-W C C T A T W-3'	PyPyHpPyHp-γ-PyHp-β-ImIm
669βp)	5'-W C C T A T W-3'	PyPy-β-PyHp-γ-PyHp-β-ImIm
670β)	5'-W C C T A A W-3'	PyPyHpPyPy-γ-HpHp-β-ImIm
670βp)	5'-W C C T A A W-3'	PyPy-β-PyPy-γ-HpHp-β-ImIm
671β)	5'-W C C T A G W-3'	PyPy-β-PyIm-γ-PyHp-β-ImIm
672β)	5'-W C C T A C W-3'	PyPyHpPyPy-γ-ImHp-β-ImIm
672βp)	5'-W C C T A C W-3'	PyPy-β-PyPy-γ-ImHp-β-ImIm
673β)	5'-W C C T G T W-3'	PyPy-β-ImHp-γ-PyPy-β-ImIm
674β)	5'-W C C T G A W-3'	PyPy-β-ImPy-γ-HpPy-β-ImIm
675β)	5'-W C C T G G W-3'	PyPy-β-ImIm-γ-PyPy-β-ImIm
676β)	5'-W C C T G C W-3'	PyPy-β-ImPy-γ-ImPy-β-ImIm
677β)	5'-W C C T C T W-3'	PyPyHpPyHp-γ-PyIm-β-ImIm
677βp)	5'-W C C T C T W-3'	PyPy-β-PyHp-γ-PyIm-β-ImIm
678β)	5'-W C C T C A W-3'	PyPyHpPyPy-γ-HpIm-β-ImIm
678βp)	5'-W C C T C A W-3'	PyPy-β-PyPy-γ-HpIm-β-ImIm
679β)	5'-W C C T C G W-3'	PyPy-β-PyIm-γ-PyIm-β-ImIm
680β)	5'-W C C T C C W-3'	PyPyHpPyPy-γ-ImIm-β-ImIm
680βp)	5'-W C C T C C W-3'	PyPy-β-PyPy-γ-ImIm-β-ImIm
681β)	5'-W C C A T T W-3'	PyPyPyHpHp-γ-PyPy-β-ImIm
681βp)	5'-W C C A T T W-3'	PyPy-β-HpHp-γ-PyPy-β-ImIm
682β)	5'-W C C A T A W-3'	PyPyPyHpPy-γ-HpPy-β-ImIm
682βp)	5'-W C C A T A W-3'	PyPy-β-HpPy-γ-HpPy-β-ImIm

TABLE 66: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
683β)	5'-W C C A T G W-3'	PyPy-β-HpIm-γ-PyPy-β-ImIm
684β)	5'-W C C A T C W-3'	PyPyPyHpPy-γ-ImPy-β-ImIm
684βp)	5'-W C C A T C W-3'	PyPy-β-HpPy-γ-ImPy-β-ImIm
685β)	5'-W C C A A T W-3'	PyPyPyPyHp-γ-PyHp-β-ImIm
685βp)	5'-W C C A A T W-3'	PyPy-β-PyHp-γ-PyHp-β-ImIm
686β)	5'-W C C A A A W-3'	PyPyPyPyPy-γ-HpHp-β-ImIm
686βp)	5'-W C C A A A W-3'	PyPy-β-PyPy-γ-HpHp-β-ImIm
687β)	5'-W C C A A G W-3'	PyPy-β-PyIm-γ-PyHp-β-ImIm
688β)	5'-W C C A A C W-3'	PyPyPyPyPy-γ-ImHp-β-ImIm
688βp)	5'-W C C A A C W-3'	PyPy-β-PyPy-γ-ImHp-β-ImIm
689β)	5'-W C C A G T W-3'	PyPy-β-ImHp-γ-PyPy-β-ImIm
690β)	5'-W C C A G A W-3'	PyPy-β-ImPy-γ-HpPy-β-ImIm
691β)	5'-W C C A G G W-3'	PyPy-β-ImIm-γ-PyPy-β-ImIm
692β)	5'-W C C A G C W-3'	PyPy-β-ImPy-γ-ImPy-β-ImIm
693β)	5'-W C C A C T W-3'	PyPyPyPyHp-γ-PyIm-β-ImIm
693βp)	5'-W C C A C T W-3'	PyPy-β-PyHp-γ-PyIm-β-ImIm
694β)	5'-W C C A C A W-3'	PyPyPyPyPy-γ-HpIm-β-ImIm
694βp)	5'-W C C A C A W-3'	PyPy-β-PyPy-γ-HpIm-β-ImIm
695β)	5'-W C C A C G W-3'	PyPy-β-PyIm-γ-PyIm-β-ImIm
696β)	5'-W C C A C C W-3'	PyPyPyPyPy-γ-ImIm-β-ImIm
696βp)	5'-W C C A C C W-3'	PyPy-β-PyPy-γ-ImIm-β-ImIm

TABLE 67: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
697β)	5'-W C C G T T W-3'	Py-β-ImHpHp-γ-PyPy-β-ImIm
698β)	5'-W C C G T A W-3'	Py-β-ImHpPy-γ-HpPy-β-ImIm
699β)	5'-W C C G T G W-3'	Py-β-ImHpIm-γ-PyPy-β-ImIm
700β)	5'-W C C G T C W-3'	Py-β-ImHpPy-γ-ImPy-β-ImIm
701β)	5'-W C C G A T W-3'	Py-β-ImPyHp-γ-PyHp-β-ImIm
702β)	5'-W C C G A A W-3'	Py-β-ImPyPy-γ-HpHp-β-ImIm
703β)	5'-W C C G A G W-3'	Py-β-ImPyIm-γ-PyHp-β-ImIm
704β)	5'-W C C G A C W-3'	Py-β-ImPyPy-γ-ImHp-β-ImIm
705β)	5'-W C C G G T W-3'	Py-β-ImImHp-γ-PyPy-β-ImIm
706β)	5'-W C C G G A W-3'	Py-β-ImImPy-γ-HpPy-β-ImIm
707β)	5'-W C C G C T W-3'	Py-β-ImPyHp-γ-PyIm-β-ImIm
708β)	5'-W C C G C A W-3'	Py-β-ImPyPy-γ-HpIm-β-ImIm
709β)	5'-W C C C T T W-3'	PyPyPyHpHp-γ-Py-β-ImImIm
709βp)	5'-W C C C T T W-3'	PyPyPy-β-Hp-γ-Py-β-ImImIm
710β)	5'-W C C C T A W-3'	PyPyPyHpPy-γ-Hp-β-ImImIm
710βp)	5'-W C C C T A W-3'	PyPyPy-β-Py-γ-Hp-β-ImImIm
711β)	5'-W C C C T G W-3'	PyPy-β-HpIm-γ-Py-β-ImImIm
712β)	5'-W C C C T C W-3'	PyPyPyHpPy-γ-Im-β-ImImIm
712βp)	5'-W C C C T C W-3'	PyPyPy-β-Py-γ-Im-β-ImImIm
713β)	5'-W C C C A T W-3'	PyPyPyPyHp-γ-Py-β-ImImIm
713βp)	5'-W C C C A T W-3'	PyPyPy-β-Hp-γ-Py-β-ImImIm
714β)	5'-W C C C A A W-3'	PyPyPyPyPy-γ-Hp-β-ImImIm
714βp)	5'-W C C C A A W-3'	PyPyPy-β-Py-γ-Hp-β-ImImIm
715β)	5'-W C C C A G W-3'	PyPy-β-PyIm-γ-Py-β-ImImIm
716β)	5'-W C C C A C W-3'	PyPyPyPyPy-γ-Im-β-ImImIm
716βp)	5'-W C C C A C W-3'	PyPyPy-β-Py-γ-Im-β-ImImIm
717β)	5'-W C C C G T W-3'	PyPy-β-ImHp-γ-Py-β-ImImIm
718β)	5'-W C C C G A W-3'	PyPy-β-ImPy-γ-Hp-β-ImImIm

TABLE 67 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
G41β)	5'-W C C G G G W-3'	Py-β-ImImIm-γ-PyPy-β-ImIm
G42β)	5'-W C C G G C W-3'	Py-β-ImImPy-γ-ImPy-β-ImIm
G43β)	5'-W C C G C G W-3'	Py-β-ImPyIm-γ-PyIm-β-ImIm
G44β)	5'-W C C G C C W-3'	Py-β-ImPyPy-γ-ImIm-β-ImIm
G45β)	5'-W C C C G G W-3'	PyPy-β-ImIm-γ-Py-β-ImImIm
G46β)	5'-W C C C G C W-3'	PyPy-β-ImPy-γ-Im-β-ImImIm
G47β)	5'-W C C C C G W-3'	PyPy-β-PyIm-γ-PyImImImIm

TABLE 68: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAGWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
723β)	5'-W A G T T G W-3'	PyIm-β-HpIm-γ-PyPyPyPyHp
723βp)	5'-W A G T T G W-3'	PyIm-β-HpIm-γ-PyPy-β-PyHp
727β)	5'-W A G T A G W-3'	PyIm-β-PyIm-γ-PyHpPyPyHp
727βp)	5'-W A G T A G W-3'	PyIm-β-PyIm-γ-PyHp-β-PyHp
729β)	5'-W A G T G T W-3'	PyIm-β-ImHp-γ-PyPyPyPyHp
729βp)	5'-W A G T G T W-3'	PyIm-β-ImHp-γ-PyPy-β-PyHp
730β)	5'-W A G T G A W-3'	PyIm-β-ImPy-γ-HpPyPyPyHp
730βp)	5'-W A G T G A W-3'	PyIm-β-ImPy-γ-HpPy-β-PyHp
731β)	5'-W A G T G G W-3'	PyIm-β-ImIm-γ-PyPyPyPyHp
731βp)	5'-W A G T G G W-3'	PyIm-β-ImIm-γ-PyPy-β-PyHp
732β)	5'-W A G T G C W-3'	PyIm-β-ImPy-γ-ImPyPyPyHp
732βp)	5'-W A G T G C W-3'	PyIm-β-ImPy-γ-ImPy-β-PyHp
735β)	5'-W A G T C G W-3'	PyIm-β-PyIm-γ-PyImPyPyHp
735βp)	5'-W A G T C G W-3'	PyIm-β-PyIm-γ-PyIm-β-PyHp
739β)	5'-W A G A T G W-3'	PyIm-β-HpIm-γ-PyPyHpPyHp
739βp)	5'-W A G A T G W-3'	PyIm-β-HpIm-γ-PyPy-β-PyHp
743β)	5'-W A G A A G W-3'	PyIm-β-PyIm-γ-PyHpHpPyHp
743βp)	5'-W A G A A G W-3'	PyIm-β-PyIm-γ-PyHp-β-PyHp
745β)	5'-W A G A G T W-3'	PyIm-β-ImHp-γ-PyPyHpPyHp
745βp)	5'-W A G A G T W-3'	PyIm-β-ImHp-γ-PyPy-β-PyHp
746β)	5'-W A G A G A W-3'	PyIm-β-ImPy-γ-HpPyHpPyHp
746βp)	5'-W A G A G A W-3'	PyIm-β-ImPy-γ-HpPy-β-PyHp
747β)	5'-W A G A G G W-3'	PyIm-β-ImIm-γ-PyPyHpPyHp
747βp)	5'-W A G A G G W-3'	PyIm-β-ImIm-γ-PyPy-β-PyHp
748β)	5'-W A G A G C W-3'	PyIm-β-ImPy-γ-ImPyHpPyHp
748βp)	5'-W A G A G C W-3'	PyIm-β-ImPy-γ-ImPy-β-PyHp
751β)	5'-W A G A C G W-3'	PyIm-β-PyIm-γ-PyImHpPyHp
751βp)	5'-W A G A C G W-3'	PyIm-β-PyIm-γ-PyIm-β-PyHp

TABLE 69: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
753β)	5'-W A G G T T W-3'	PyImIm-β-Hp-γ-PyPyPyPyHp
753βp)	5'-W A G G T T W-3'	PyImIm-β-Hp-γ-Py-β-PyPyHp
754β)	5'-W A G G T A W-3'	PyImIm-β-Py-γ-HpPyPyPyHp
754βp)	5'-W A G G T A W-3'	PyImIm-β-Py-γ-Hp-β-PyPyHp
755β)	5'-W A G G T G W-3'	PyImIm-β-Im-γ-PyPyPyPyHp
755βp)	5'-W A G G T G W-3'	PyImIm-β-Im-γ-Py-β-PyPyHp
756β)	5'-W A G G T C W-3'	PyImIm-β-Py-γ-ImPyPyPyHp
756βp)	5'-W A G G T C W-3'	PyImIm-β-Py-γ-Im-β-PyPyHp
757β)	5'-W A G G A T W-3'	PyImIm-β-Hp-γ-PyHpPyPyHp
757βp)	5'-W A G G A T W-3'	PyImIm-β-Hp-γ-Py-β-PyPyHp
758β)	5'-W A G G A A W-3'	PyImIm-β-Py-γ-HpHpPyPyHp
758βp)	5'-W A G G A A W-3'	PyImIm-β-Py-γ-Hp-β-PyPyHp
759β)	5'-W A G G A G W-3'	PyImIm-β-Im-γ-PyHpPyPyHp
759βp)	5'-W A G G A G W-3'	PyImIm-β-Im-γ-Py-β-PyPyHp
760β)	5'-W A G G A C W-3'	PyImIm-β-Py-γ-ImHpPyPyHp
760βp)	5'-W A G G A C W-3'	PyImIm-β-Py-γ-Im-β-PyPyHp
763β)	5'-W A G G C T W-3'	PyImIm-β-Hp-γ-PyImPyPyHp
764β)	5'-W A G G C A W-3'	PyImIm-β-Py-γ-HpImPyPyHp
765β)	5'-W A G C T T W-3'	PyImPyHpHp-γ-Py-β-ImPyHp
765βp)	5'-W A G C T T W-3'	PyImPy-β-Hp-γ-Py-β-ImPyHp
766β)	5'-W A G C T A W-3'	PyImPyHpPy-γ-Hp-β-ImPyHp
766βp)	5'-W A G C T A W-3'	PyImPy-β-Py-γ-Hp-β-ImPyHp
767β)	5'-W A G C T G W-3'	PyIm-β-HpIm-γ-Py-β-ImPyHp
768β)	5'-W A G C T C W-3'	PyImPyHpPy-γ-Im-β-ImPyHp
768βp)	5'-W A G C T C W-3'	PyImPy-β-Py-γ-Im-β-ImPyHp
769β)	5'-W A G C A T W-3'	PyImPyPyHp-γ-Py-β-ImPyHp
769βp)	5'-W A G C A T W-3'	PyImPy-β-Hp-γ-Py-β-ImPyHp
770β)	5'-W A G C A A W-3'	PyImPyPyPy-γ-Hp-β-ImPyHp

TABLE 69 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
770βp)	5'-W A G C A A W-3'	PyImPy-β-Py-γ-Hp-β-ImPyHp
771β)	5'-W A G C A G W-3'	PyIm-β-PyIm-γ-Py-β-ImPyHp
772β)	5'-W A G C A C W-3'	PyImPyPyPy-γ-Im-β-ImPyHp
772βp)	5'-W A G C A C W-3'	PyImPy-β-Py-γ-Im-β-ImPyHp
773β)	5'-W A G C G T W-3'	PyIm-β-ImHp-γ-Py-β-ImPyHp
774β)	5'-W A G C G A W-3'	PyIm-β-ImPy-γ-Hp-β-ImPyHp
775β)	5'-W A G C C T W-3'	PyImPyPyHp-γ-PyImIm-β-Hp
776β)	5'-W A G C C A W-3'	PyImPyPyPy-γ-HpImIm-β-Hp
779β)	5'-W A G G C G W-3'	PyImIm-β-Im-γ-PyImPyPyHp
780β)	5'-W A G G C C W-3'	PyImIm-β-Py-γ-ImImPyPyHp
781β)	5'-W A G C G G W-3'	PyIm-β-ImIm-γ-Py-β-ImPyHp
782β)	5'-W A G C G C W-3'	PyIm-β-ImPy-γ-Im-β-ImPyHp
783β)	5'-W A G C C G W-3'	PyIm-β-PyIm-γ-PyImIm-β-Hp
784β)	5'-W A G C C C W-3'	PyImPyPyPy-γ-ImImIm-β-Hp

TABLE 70: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WATWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
787β)	5'-W A T T T G W-3'	PyHp-β-HpIm-γ-PyPyPyPyHp
787βp)	5'-W A T T T G W-3'	PyHp-β-HpIm-γ-PyPy-β-PyHp
791β)	5'-W A T T A G W-3'	PyHp-β-PyIm-γ-PyHpPyPyHp
791βp)	5'-W A T T A G W-3'	PyHp-β-PyIm-γ-PyHp-β-PyHp
793β)	5'-W A T T G T W-3'	PyHp-β-ImHp-γ-PyPyPyPyHp
793βp)	5'-W A T T G T W-3'	PyHp-β-ImHp-γ-PyPy-β-PyHp
794β)	5'-W A T T G A W-3'	PyHp-β-ImPy-γ-HpPyPyPyHp
794βp)	5'-W A T T G A W-3'	PyHp-β-ImPy-γ-HpPy-β-PyHp
795β)	5'-W A T T G G W-3'	PyHp-β-ImIm-γ-PyPyPyPyHp
795βp)	5'-W A T T G G W-3'	PyHp-β-ImPy-γ-ImPyPyPyHp
796βp)	5'-W A T T G C W-3'	PyHp-β-ImPy-γ-ImPy-β-PyHp
799β)	5'-W A T T C G W-3'	PyHp-β-PyIm-γ-PyImPyPyHp
799βp)	5'-W A T T C G W-3'	PyHp-β-PyIm-γ-PyIm-β-PyHp
803β)	5'-W A T A T G W-3'	PyHp-β-HpIm-γ-PyPyHpPyHp
803βp)	5'-W A T A T G W-3'	PyHp-β-HpIm-γ-PyPy-β-PyHp
807β)	5'-W A T A A G W-3'	PyHp-β-PyIm-γ-PyHpHpPyHp
807βp)	5'-W A T A A G W-3'	PyHp-β-PyIm-γ-PyHp-β-PyHp
809β)	5'-W A T A G T W-3'	PyHp-β-ImHp-γ-PyPyHpPyHp
809βp)	5'-W A T A G T W-3'	PyHp-β-ImHp-γ-PyPy-β-PyHp
810β)	5'-W A T A G A W-3'	PyHp-β-ImPy-γ-HpPyHpPyHp
810βp)	5'-W A T A G A W-3'	PyHp-β-ImPy-γ-HpPy-β-PyHp
811β)	5'-W A T A G G W-3'	PyHp-β-ImIm-γ-PyPyHpPyHp
811βp)	5'-W A T A G G W-3'	PyHp-β-ImIm-γ-PyPy-β-PyHp
812β)	5'-W A T A G C W-3'	PyHp-β-ImPy-γ-ImPyHpPyHp
812βp)	5'-W A T A G C W-3'	PyHp-β-ImPy-γ-ImPy-β-PyHp
815β)	5'-W A T A C G W-3'	PyHp-β-PyIm-γ-PyImHpPyHp
815βp)	5'-W A T A C G W-3'	PyHp-β-PyIm-γ-PyIm-β-PyHp

TABLE 71: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WATSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
817β)	5'-W A T G T T W-3'	Py-β-ImHpHp-γ-PyPyPyPyHp
817βp)	5'-W A T G T T W-3'	Py-β-ImHpHp-γ-PyPyPy-β-Hp
818β)	5'-W A T G T A W-3'	Py-β-ImHpPy-γ-HpPyPyPyHp
818βp)	5'-W A T G T A W-3'	Py-β-ImHpPy-γ-HpPyPy-β-Hp
819β)	5'-W A T G T G W-3'	Py-β-ImHpIm-γ-PyPyPyPyHp
819βp)	5'-W A T G T G W-3'	Py-β-ImHpIm-γ-PyPyPy-β-Hp
820β)	5'-W A T G T C W-3'	Py-β-ImHpPy-γ-ImPyPyPyHp
820βp)	5'-W A T G T C W-3'	Py-β-ImHpPy-γ-ImPyPy-β-Hp
821β)	5'-W A T G A T W-3'	Py-β-ImPyHp-γ-PyHpPyPyHp
821βp)	5'-W A T G A T W-3'	Py-β-ImPyHp-γ-PyHpPy-β-Hp
822β)	5'-W A T G A A W-3'	Py-β-ImPyPy-γ-HpHpPyPyHp
822βp)	5'-W A T G A A W-3'	Py-β-ImPyPy-γ-HpHpPy-β-Hp
823β)	5'-W A T G A G W-3'	Py-β-ImPyIm-γ-PyHpPyPyHp
823βp)	5'-W A T G A G W-3'	Py-β-ImPyIm-γ-PyHpPy-β-Hp
824β)	5'-W A T G A C W-3'	Py-β-ImPyPy-γ-ImHpPyPyHp
824βp)	5'-W A T G A C W-3'	Py-β-ImPyPy-γ-ImHpPy-β-Hp
825β)	5'-W A T G G T W-3'	Py-β-ImImHp-γ-PyPyPyPyHp
825βp)	5'-W A T G G T W-3'	Py-β-ImImHp-γ-PyPyPy-β-Hp
826β)	5'-W A T G G A W-3'	Py-β-ImImPy-γ-HpPyPyPyHp
826βp)	5'-W A T G G A W-3'	Py-β-ImImPy-γ-HpPyPy-β-Hp
827β)	5'-W A T G C T W-3'	Py-β-ImPyHp-γ-PyImPyPyHp
827βp)	5'-W A T G C T W-3'	Py-β-ImPyHp-γ-PyImPy-β-Hp
828β)	5'-W A T G C A W-3'	Py-β-ImPyPy-γ-HpImPyPyHp
828βp)	5'-W A T G C A W-3'	Py-β-ImPyPy-γ-HpImPy-β-Hp
829β)	5'-W A T G G G W-3'	Py-β-ImImIm-γ-PyPyPyPyHp
829βp)	5'-W A T G G G W-3'	Py-β-ImImIm-γ-PyPyPy-β-Hp
830β)	5'-W A T G G C W-3'	Py-β-ImImPy-γ-ImPyPyPyHp
830βp)	5'-W A T G G C W-3'	Py-β-ImImPy-γ-ImPyPy-β-Hp
831β)	5'-W A T G C G W-3'	Py-β-ImPyIm-γ-PyImPyPyHp
831βp)	5'-W A T G C G W-3'	Py-β-ImPyIm-γ-PyImPy-β-Hp

TABLE 71: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WATSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
832β)	5'-W A T G C C W-3'	Py-β-ImPyPy-γ-ImImPyPyHp
832βp)	5'-W A T G C C W-3'	Py-β-ImPyPy-γ-ImImPy-β-Hp
833β)	5'-W A T C T T W-3'	PyHpPyHpHp-γ-Py-β-ImPyHp
833βp)	5'-W A T C T T W-3'	PyHpPy-β-Hp-γ-Py-β-ImPyHp
834β)	5'-W A T C T A W-3'	PyHpPyHpPy-γ-Hp-β-ImPyHp
834βp)	5'-W A T C T A W-3'	PyHpPy-β-Py-γ-Hp-β-ImPyHp
835β)	5'-W A T C T G W-3'	PyHp-β-HpIm-γ-Py-β-ImPyHp
836β)	5'-W A T C T C W-3'	PyHpPyHpPy-γ-Im-β-ImPyHp
836βp)	5'-W A T C T C W-3'	PyHpPy-β-Py-γ-Im-β-ImPyHp
837β)	5'-W A T C A T W-3'	PyHpPyPyHp-γ-Py-β-ImPyHp
837βp)	5'-W A T C A T W-3'	PyHpPy-β-Hp-γ-Py-β-ImPyHp
838β)	5'-W A T C A A W-3'	PyHpPyPyPy-γ-Hp-β-ImPyHp
838βp)	5'-W A T C A A W-3'	PyHpPy-β-Py-γ-Hp-β-ImPyHp
839β)	5'-W A T C A G W-3'	PyHp-β-PyIm-γ-Py-β-ImPyHp
840β)	5'-W A T C A C W-3'	PyHpPyPyPy-γ-Im-β-ImPyHp
840βp)	5'-W A T C A C W-3'	PyHpPy-β-Py-γ-Im-β-ImPyHp
841β)	5'-W A T C G T W-3'	PyHp-β-ImHp-γ-Py-β-ImPyHp
842β)	5'-W A T C G A W-3'	PyHp-β-ImPy-γ-Hp-β-ImPyHp
843β)	5'-W A T C C T W-3'	PyHpPyPyHp-γ-PyImIm-β-Hp
843βp)	5'-W A T C C T W-3'	Py-β-PyPyHp-γ-PyImIm-β-Hp
844β)	5'-W A T C C A W-3'	PyHpPyPyPy-γ-HpImIm-β-Hp
844βp)	5'-W A T C C A W-3'	Py-β-PyPyPy-γ-HpImIm-β-Hp
845β)	5'-W A T C G G W-3'	PyHp-β-ImIm-γ-Py-β-ImPyHp
846β)	5'-W A T C G C W-3'	PyHp-β-ImPy-γ-Im-β-ImPyHp
847β)	5'-W A T C C G W-3'	PyHp-β-PyIm-γ-PyImIm-β-Hp
848β)	5'-W A T C C C W-3'	PyHpPyPyPy-γ-ImImIm-β-Hp
848βp)	5'-W A T C C C W-3'	Py-β-PyPyPy-γ-ImImIm-β-Hp

TABLE 72: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAAWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
851β)	5'-W A A T T G W-3'	PyPy-β-HpIm-γ-PyPyPyHpHp
851βp)	5'-W A A T T G W-3'	PyPy-β-HpIm-γ-PyPy-β-HpHp
855β)	5'-W A A T A G W-3'	PyPy-β-PyIm-γ-PyHpPyHpHp
855βp)	5'-W A A T A G W-3'	PyPy-β-PyIm-γ-PyHp-β-HpHp
857β)	5'-W A A T G T W-3'	PyPy-β-ImHp-γ-PyPyPyHpHp
857βp)	5'-W A A T G T W-3'	PyPy-β-ImHp-γ-PyPy-β-HpHp
858β)	5'-W A A T G A W-3'	PyPy-β-ImPy-γ-HpPyPyHpHp
858βp)	5'-W A A T G A W-3'	PyPy-β-ImPy-γ-HpPy-β-HpHp
859β)	5'-W A A T G G W-3'	PyPy-β-ImIm-γ-PyPyPyHpHp
859βp)	5'-W A A T G G W-3'	PyPy-β-ImIm-γ-PyPy-β-HpHp
860β)	5'-W A A T G C W-3'	PyPy-β-ImPy-γ-ImPyPyHpHp
860βp)	5'-W A A T G C W-3'	PyPy-β-ImPy-γ-ImPy-β-HpHp
863β)	5'-W A A T C G W-3'	PyPy-β-PyIm-γ-PyImPyHpHp
863βp)	5'-W A A T C G W-3'	PyPy-β-PyIm-γ-PyIm-β-HpHp
867β)	5'-W A A A T G W-3'	PyPy-β-HpIm-γ-PyPyHpHpHp
867βp)	5'-W A A A T G W-3'	PyPy-β-HpIm-γ-PyPy-β-HpHp
871β)	5'-W A A A A A G W-3'	PyPy-β-PyIm-γ-PyHpHpHpHp
871βp)	5'-W A A A A A G W-3'	PyPy-β-PyIm-γ-PyHp-β-HpHp
873β)	5'-W A A A G T W-3'	PyPy-β-ImHp-γ-PyPyHpHpHp
873βp)	5'-W A A A G T W-3'	PyPy-β-ImHp-γ-PyPy-β-HpHp
874β)	5'-W A A A G A W-3'	PyPy-β-ImPy-γ-HpPyHpHpHp
874βp)	5'-W A A A G A W-3'	PyPy-β-ImPy-γ-HpPy-β-HpHp
875β)	5'-W A A A G G W-3'	PyPy-β-ImIm-γ-PyPyHpHpHp
875βp)	5'-W A A A G G W-3'	PyPy-β-ImIm-γ-PyPy-β-HpHp
876β)	5'-W A A A G C W-3'	PyPy-β-ImPy-γ-ImPyHpHpHp
876βp)	5'-W A A A G C W-3'	PyPy-β-ImPy-γ-ImPy-β-HpHp
879β)	5'-W A A A C G W-3'	PyPy-β-PyIm-γ-PyImHpHpHp
879βp)	5'-W A A A C G W-3'	PyPy-β-PyIm-γ-PyIm-β-HpHp

TABLE 73: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
881β)	5'-W A A G T T W-3'	Py-β-ImHpHp-γ-PyPyPyHpHp
881βp)	5'-W A A G T T W-3'	Py-β-ImHpHp-γ-PyPyPy-β-Hp
882β)	5'-W A A G T A W-3'	Py-β-ImHpPy-γ-HpPyPyHpHp
882βp)	5'-W A A G T A W-3'	Py-β-ImHpPy-γ-HpPyPy-β-Hp
883β)	5'-W A A G T G W-3'	Py-β-ImHpIm-γ-PyPyPyHpHp
883βp)	5'-W A A G T G W-3'	Py-β-ImHpIm-γ-PyPyPy-β-Hp
884β)	5'-W A A G T C W-3'	Py-β-ImHpPy-γ-ImPyPyHpHp
884βp)	5'-W A A G T C W-3'	Py-β-ImHpPy-γ-ImPyPy-β-Hp
885β)	5'-W A A G A T W-3'	Py-β-ImPyHp-γ-PyHpPyHpHp
885βp)	5'-W A A G A T W-3'	Py-β-ImPyHp-γ-PyHpPy-β-Hp
886β)	5'-W A A G A A W-3'	Py-β-ImPyPy-γ-HpHpPyHpHp
886βp)	5'-W A A G A A W-3'	Py-β-ImPyPy-γ-HpHpPy-β-Hp
887β)	5'-W A A G A G W-3'	Py-β-ImPyIm-γ-PyHpPyHpHp
887βp)	5'-W A A G A G W-3'	Py-β-ImPyIm-γ-PyHpPy-β-Hp
888β)	5'-W A A G A C W-3'	Py-β-ImPyPy-γ-ImHpPyHpHp
888βp)	5'-W A A G A C W-3'	Py-β-ImPyPy-γ-ImHpPy-β-Hp
889β)	5'-W A A G G T W-3'	Py-β-ImImHp-γ-PyPyPyHpHp
889βp)	5'-W A A G G T W-3'	Py-β-ImImHp-γ-PyPyPy-β-Hp
890β)	5'-W A A G G A W-3'	Py-β-ImImPy-γ-HpPyPyHpHp
890βp)	5'-W A A G G A W-3'	Py-β-ImImPy-γ-HpPyPy-β-Hp
891β)	5'-W A A G C T W-3'	Py-β-ImPyHp-γ-PyImPyHpHp
891βp)	5'-W A A G C T W-3'	Py-β-ImPyHp-γ-PyImPy-β-Hp
892β)	5'-W A A G C A W-3'	Py-β-ImPyPy-γ-HpImPyHpHp
892βp)	5'-W A A G C A W-3'	Py-β-ImPyPy-γ-HpImPy-β-Hp
893β)	5'-W A A G G G W-3'	Py-β-ImImIm-γ-PyPyPyHpHp
893βp)	5'-W A A G G G W-3'	Py-β-ImImIm-γ-PyPyPy-β-Hp
894β)	5'-W A A G G C W-3'	Py-β-ImImPy-γ-ImPyPyHpHp
894βp)	5'-W A A G G C W-3'	Py-β-ImImPy-γ-ImPyPy-β-Hp
895β)	5'-W A A G C G W-3'	Py-β-ImPyIm-γ-PyImPyHpHp
895βp)	5'-W A A G C G W-3'	Py-β-ImPyIm-γ-PyImPy-β-Hp

TABLE 73 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
896β)	5'-W A A G C C W-3'	Py-β-ImPyPy-γ-ImImPyHpHp
896βp)	5'-W A A G C C W-3'	Py-β-ImPyPy-γ-ImImPy-β-Hp
897β)	5'-W A A C T T W-3'	PyPyPyHpHp-γ-Py-β-ImHpHp
897βp)	5'-W A A C T T W-3'	PyPyPy-β-Hp-γ-Py-β-ImHpHp
898β)	5'-W A A C T A W-3'	PyPyPyHpPy-γ-Hp-β-ImHpHp
898βp)	5'-W A A C T A W-3'	PyPyPy-β-Py-γ-Hp-β-ImHpHp
899β)	5'-W A A C T G W-3'	PyPy-β-HpIm-γ-Py-β-ImHpHp
900β)	5'-W A A C T C W-3'	PyPyPyHpPy-γ-Im-β-ImHpHp
900βp)	5'-W A A C T C W-3'	PyPyPy-β-Py-γ-Im-β-ImHpHp
901β)	5'-W A A C A T W-3'	PyPyPyPyHp-γ-Py-β-ImHpHp
901βp)	5'-W A A C A T W-3'	PyPyPy-β-Hp-γ-Py-β-ImHpHp
902β)	5'-W A A C A A W-3'	PyPyPyPyPy-γ-Hp-β-ImHpHp
902βp)	5'-W A A C A A W-3'	PyPyPy-β-Py-γ-Hp-β-ImHpHp
903β)	5'-W A A C A G W-3'	PyPy-β-PyIm-γ-Py-β-ImHpHp
904β)	5'-W A A C A C W-3'	PyPyPyPyPy-γ-Im-β-ImHpHp
904βp)	5'-W A A C A C W-3'	PyPyPy-β-Py-γ-Im-β-ImHpHp
905β)	5'-W A A C G T W-3'	PyPy-β-ImHp-γ-Py-β-ImHpHp
906β)	5'-W A A C G A W-3'	PyPy-β-ImPy-γ-Hp-β-ImHpHp
907β)	5'-W A A C C T W-3'	PyPyPyPyHp-γ-PyImIm-β-Hp
907βp)	5'-W A A C C T W-3'	Py-β-PyPyHp-γ-PyImIm-β-Hp
908β)	5'-W A A C C A W-3'	PyPyPyPyPy-γ-HpImIm-β-Hp
908βp)	5'-W A A C C A W-3'	Py-β-PyPyPy-γ-HpImIm-β-Hp
909β)	5'-W A A C G G W-3'	PyPy-β-ImIm-γ-Py-β-ImHpHp
910β)	5'-W A A C G C W-3'	PyPy-β-ImPy-γ-Im-β-ImHpHp
911β)	5'-W A A C C G W-3'	PyPy-β-PyIm-γ-PyImIm-β-Hp
912β)	5'-W A A C C C W-3'	PyPyPyPyPy-γ-ImImIm-β-Hp
912βp)	5'-W A A C C C W-3'	Py-β-PyPyPy-γ-ImImIm-β-Hp

TABLE 74: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
913β)	5'-W A C T T T W-3'	PyPyHpHpHp-γ-PyPy-β-ImHp
913βp)	5'-W A C T T T W-3'	PyPy-β-HpHp-γ-PyPy-β-ImHp
914β)	5'-W A C T T A W-3'	PyPyHpHpPy-γ-HpPy-β-ImHp
914βp)	5'-W A C T T A W-3'	PyPy-β-HpPy-γ-HpPy-β-ImHp
915β)	5'-W A C T T G W-3'	PyPy-β-HpIm-γ-PyPy-β-ImHp
916β)	5'-W A C T T C W-3'	PyPyHpHpPy-γ-ImPy-β-ImHp
916βp)	5'-W A C T T C W-3'	PyPy-β-HpPy-γ-ImPy-β-ImHp
917β)	5'-W A C T A T W-3'	PyPyHpPyHp-γ-PyHp-β-ImHp
917βp)	5'-W A C T A T W-3'	PyPyHpPyHp-γ-PyHp-β-ImHp
918β)	5'-W A C T A A W-3'	PyPyHpPyPy-γ-HpHp-β-ImHp
918βp)	5'-W A C T A A W-3'	PyPy-β-PyPy-γ-HpHp-β-ImHp
919β)	5'-W A C T A G W-3'	PyPy-β-PyIm-γ-PyHp-β-ImHp
920β)	5'-W A C T A C W-3'	PyPyHpPyPy-γ-ImHp-β-ImHp
920βp)	5'-W A C T A C W-3'	PyPy-β-PyPy-γ-ImHp-β-ImHp
921β)	5'-W A C T G T W-3'	PyPy-β-ImHp-γ-PyPy-β-ImHp
922β)	5'-W A C T G A W-3'	PyPy-β-ImPy-γ-HpPy-β-ImHp
923β)	5'-W A C T G G W-3'	PyPy-β-ImIm-γ-PyPy-β-ImHp
924β)	5'-W A C T G C W-3'	PyPy-β-ImPy-γ-ImPy-β-ImHp
925β)	5'-W A C T C T W-3'	PyPyHpPyHp-γ-PyIm-β-ImHp
925βp)	5'-W A C T C T W-3'	PyPy-β-PyHp-γ-PyIm-β-ImHp
926β)	5'-W A C T C A W-3'	PyPyHpPyPy-γ-HpIm-β-ImHp
926βp)	5'-W A C T C A W-3'	PyPy-β-PyPy-γ-HpIm-β-ImHp
927β)	5'-W A C T C G W-3'	PyPy-β-PyIm-γ-PyIm-β-ImHp
928β)	5'-W A C T C C W-3'	PyPyHpPyPy-γ-ImIm-β-ImHp
928βp)	5'-W A C T C C W-3'	PyPy-β-PyPy-γ-ImIm-β-ImHp
929β)	5'-W A C A T T W-3'	PyPyPyHpHp-γ-PyPy-β-ImHp
929βp)	5'-W A C A T T W-3'	PyPy-β-HpHp-γ-PyPy-β-ImHp
930β)	5'-W A C A T A W-3'	PyPyPyHpPy-γ-HpPy-β-ImHp
930βp)	5'-W A C A T A W-3'	PyPy-β-HpPy-γ-HpPy-β-ImHp
931β)	5'-W A C A T G W-3'	PyPy-β-HpIm-γ-PyPy-β-ImHp

TABLE 74 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
932β)	5'-W A C A T C W-3'	PyPyPyHpPy-γ-ImPy-β-ImHp
932βp)	5'-W A C A T C W-3'	PyPy-β-HpPy-γ-ImPy-β-ImHp
933β)	5'-W A C A A T W-3'	PyPyPyPyHp-γ-PyHp-β-ImHp
933βp)	5'-W A C A A T W-3'	PyPy-β-PyHp-γ-PyHp-β-ImHp
934β)	5'-W A C A A A W-3'	PyPyPyPyPy-γ-HpHp-β-ImHp
934βp)	5'-W A C A A A W-3'	PyPy-β-PyPy-γ-HpHp-β-ImHp
935β)	5'-W A C A A G W-3'	PyPy-β-PyIm-γ-PyHp-β-ImHp
936β)	5'-W A C A A C W-3'	PyPyPyPyPy-γ-ImHp-β-ImHp
936βp)	5'-W A C A A C W-3'	PyPy-β-PyPy-γ-ImHp-β-ImHp
937β)	5'-W A C A G T W-3'	PyPy-β-ImHp-γ-PyPy-β-ImHp
938β)	5'-W A C A G A W-3'	PyPy-β-ImPy-γ-HpPy-β-ImHp
939β)	5'-W A C A G G W-3'	PyPy-β-ImIm-γ-PyPy-β-ImHp
940β)	5'-W A C A G C W-3'	PyPy-β-ImPy-γ-ImPy-β-ImHp
941β)	5'-W A C A C T W-3'	PyPyPyPyHp-γ-PyIm-β-ImHp
941βp)	5'-W A C A C T W-3'	PyPy-β-PyHp-γ-PyIm-β-ImHp
942β)	5'-W A C A C A W-3'	PyPyPyPyPy-γ-HpIm-β-ImHp
942βp)	5'-W A C A C A W-3'	PyPy-β-PyPy-γ-HpIm-β-ImHp
943β)	5'-W A C A C G W-3'	PyPy-β-PyIm-γ-PyIm-β-ImHp
944β)	5'-W A C A C C W-3'	PyPyPyPyPy-γ-ImIm-β-ImHp
944βp)	5'-W A C A C C W-3'	PyPy-β-PyPy-γ-ImIm-β-ImHp

TABLE 75: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
945β)	5'-W A C G T T W-3'	Py-β-ImHpHp-γ-PyPy-β-ImHp
946β)	5'-W A C G T A W-3'	Py-β-ImHpPy-γ-HpPy-β-ImHp
947β)	5'-W A C G T G W-3'	Py-β-ImHpIm-γ-PyPy-β-ImHp
948β)	5'-W A C G T C W-3'	Py-β-ImHpPy-γ-ImPy-β-ImHp
949β)	5'-W A C G A T W-3'	Py-β-ImPyHp-γ-PyHp-β-ImHp
950β)	5'-W A C G A A W-3'	Py-β-ImPyPy-γ-HpHp-β-ImHp
951β)	5'-W A C G A G W-3'	Py-β-ImPyIm-γ-PyHp-β-ImHp
952β)	5'-W A C G A C W-3'	Py-β-ImPyPy-γ-ImHp-β-ImHp
953β)	5'-W A C G G T W-3'	Py-β-ImImHp-γ-PyPy-β-ImHp
954β)	5'-W A C G G A W-3'	Py-β-ImImPy-γ-HpPy-β-ImHp
955β)	5'-W A C G C T W-3'	Py-β-ImPyHp-γ-PyIm-β-ImHp
956β)	5'-W A C G C A W-3'	Py-β-ImPyPy-γ-HpIm-β-ImHp
957β)	5'-W A C C T T W-3'	PyPyPyHpHp-γ-Py-β-ImImHp
957βp)	5'-W A C C T T W-3'	PyPyPy-β-Hp-γ-Py-β-ImImHp
958β)	5'-W A C C T A W-3'	PyPyPyHpPy-γ-Hp-β-ImImHp
958βp)	5'-W A C C T A W-3'	PyPyPy-β-Py-γ-Hp-β-ImImHp
959β)	5'-W A C C T G W-3'	PyPy-β-HpIm-γ-Py-β-ImImHp
960β)	5'-W A C C T C W-3'	PyPyPyHpPy-γ-Im-β-ImImHp
960βp)	5'-W A C C T C W-3'	PyPyPy-β-Py-γ-Im-β-ImImHp
961β)	5'-W A C C A T W-3'	PyPyPyPyHp-γ-Py-β-ImImHp
961βp)	5'-W A C C A T W-3'	PyPyPy-β-Hp-γ-Py-β-ImImHp
962β)	5'-W A C C A A W-3'	PyPyPyPyPy-γ-Hp-β-ImImHp
962βp)	5'-W A C C A A W-3'	PyPyPy-β-Py-γ-Hp-β-ImImHp
963β)	5'-W A C C A G W-3'	PyPy-β-PyIm-γ-Py-β-ImImHp
964β)	5'-W A C C A C W-3'	PyPyPyPyPy-γ-Im-β-ImImHp
964βp)	5'-W A C C A C W-3'	PyPyPy-β-Py-γ-Im-β-ImImHp
965β)	5'-W A C C G T W-3'	PyPy-β-ImHp-γ-Py-β-ImImHp
966β)	5'-W A C C G A W-3'	PyPy-β-ImPy-γ-Hp-β-ImImHp
969β)	5'-W A C G G G W-3'	Py-β-ImImIm-γ-PyPy-β-ImHp
970β)	5'-W A C G G C W-3'	Py-β-ImImPy-γ-ImPy-β-ImHp

TABLE 75 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
971β)	5'-W A C G C G W-3'	Py-β-ImPyIm-γ-PyIm-β-ImHp
972β)	5'-W A C G C C W-3'	Py-β-ImPyPy-γ-ImIm-β-ImHp
973β)	5'-W A C C G G W-3'	PyPy-β-ImIm-γ-Py-β-ImImHp
974β)	5'-W A C C G C W-3'	PyPy-β-ImPy-γ-Im-β-ImImHp
975β)	5'-W A C C C G W-3'	PyPy-β-PyIm-γ-PyImImImHp

TABLE 76: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
979β)	5'-W T G T T G W-3'	HpIm-β-HpIm-γ-PyPyPyPyPy
979βp)	5'-W T G T T G W-3'	HpIm-β-HpIm-γ-PyPy-β-PyPy
983β)	5'-W T G T A G W-3'	HpIm-β-PyIm-γ-PyHpPyPyPy
983βp)	5'-W T G T A G W-3'	HpIm-β-PyIm-γ-PyHp-β-PyPy
985β)	5'-W T G T G T W-3'	HpIm-β-ImHp-γ-PyPyPyPyPy
985βp)	5'-W T G T G T W-3'	HpIm-β-ImHp-γ-PyPy-β-PyPy
986β)	5'-W T G T G A W-3'	HpIm-β-ImPy-γ-HpPyPyPyPy
986βp)	5'-W T G T G A W-3'	HpIm-β-ImPy-γ-HpPy-β-PyPy
987β)	5'-W T G T G G W-3'	HpIm-β-ImIm-γ-PyPyPyPyPy
987βp)	5'-W T G T G G W-3'	HpIm-β-ImIm-γ-PyPy-β-PyPy
988β)	5'-W T G T G C W-3'	HpIm-β-ImPy-γ-ImPyPyPyPy
988βp)	5'-W T G T G C W-3'	HpIm-β-ImPy-γ-ImPy-β-PyPy
991β)	5'-W T G T C G W-3'	HpIm-β-PyIm-γ-PyImPyPyPy
991βp)	5'-W T G T C G W-3'	HpIm-β-PyIm-γ-PyIm-β-PyPy
995β)	5'-W T G A T G W-3'	HpIm-β-HpIm-γ-PyPyHpPyPy
995βp)	5'-W T G A T G W-3'	HpIm-β-HpIm-γ-PyPy-β-PyPy
999β)	5'-W T G A A G W-3'	HpIm-β-PyIm-γ-PyHpHpPyPy
999βp)	5'-W T G A A G W-3'	HpIm-β-PyIm-γ-PyHp-β-PyPy
1001β)	5'-W T G A G T W-3'	HpIm-β-ImHp-γ-PyPyHpPyPy
1001βp)	5'-W T G A G T W-3'	HpIm-β-ImHp-γ-PyPy-β-PyPy
1002β)	5'-W T G A G A W-3'	HpIm-β-ImPy-γ-HpPyHpPyPy
1002βp)	5'-W T G A G A W-3'	HpIm-β-ImPy-γ-HpPy-β-PyPy
1003β)	5'-W T G A G G W-3'	HpIm-β-ImIm-γ-PyPyHpPyPy
1003βp)	5'-W T G A G G W-3'	HpIm-β-ImIm-γ-PyPy-β-PyPy
1004β)	5'-W T G A G C W-3'	HpIm-β-ImPy-γ-ImPyHpPyPy
1004βp)	5'-W T G A G C W-3'	HpIm-β-ImPy-γ-ImPy-β-PyPy
1007β)	5'-W T G A C G W-3'	HpIm-β-PyIm-γ-PyImHpPyPy
1007βp)	5'-W T G A C G W-3'	HpIm-β-PyIm-γ-PyIm-β-PyPy

TABLE 77: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
1009β)	5'-W T G G T T W-3'	HpImIm-β-Hp-γ-PyPyPyPyPy
1009βp)	5'-W T G G T T W-3'	HpImIm-β-Hp-γ-Py-β-PyPyPy
1010β)	5'-W T G G T A W-3'	HpImIm-β-Py-γ-HpPyPyPyPy
1010βp)	5'-W T G G T A W-3'	HpImIm-β-Py-γ-Hp-β-PyPyPy
1011β)	5'-W T G G T G W-3'	HpImIm-β-Im-γ-PyPyPyPyPy
1011βp)	5'-W T G G T G W-3'	HpImIm-β-Im-γ-Py-β-PyPyPy
1012β)	5'-W T G G T C W-3'	HpImIm-β-Py-γ-ImPyPyPyPy
1012βp)	5'-W T G G T C W-3'	HpImIm-β-Py-γ-Im-β-PyPyPy
1013β)	5'-W T G G A T W-3'	HpImIm-β-Hp-γ-PyHpPyPyPy
1013βp)	5'-W T G G A T W-3'	HpImIm-β-Hp-γ-Py-β-PyPyPy
1014β)	5'-W T G G A A W-3'	HpImIm-β-Py-γ-HpHpPyPyPy
1014βp)	5'-W T G G A A W-3'	HpImIm-β-Py-γ-Hp-β-PyPyPy
1015β)	5'-W T G G A G W-3'	HpImIm-β-Im-γ-PyHpPyPyPy
1015βp)	5'-W T G G A G W-3'	HpImIm-β-Im-γ-Py-β-PyPyPy
1016β)	5'-W T G G A C W-3'	HpImIm-β-Py-γ-ImHpPyPyPy
1016βp)	5'-W T G G A C W-3'	HpImIm-β-Py-γ-Im-β-PyPyPy
1019β)	5'-W T G G C T W-3'	HpImIm-β-Hp-γ-PyImPyPyPy
1020β)	5'-W T G G C A W-3'	HpImIm-β-Py-γ-HpImPyPyPy
1021β)	5'-W T G C T T W-3'	HpImPyHpHp-γ-Py-β-ImPyPy
1021βp)	5'-W T G C T T W-3'	HpImPy-β-Hp-γ-Py-β-ImPyPy
1022β)	5'-W T G C T A W-3'	HpImPyHpPy-γ-Hp-β-ImPyPy
1022βp)	5'-W T G C T A W-3'	HpImPy-β-Py-γ-Hp-β-ImPyPy
1023β)	5'-W T G C T G W-3'	HpIm-β-HpIm-γ-Py-β-ImPyPy
1024β)	5'-W T G C T C W-3'	HpImPyHpPy-γ-Im-β-ImPyPy
1024βp)	5'-W T G C T C W-3'	HpImPy-β-Py-γ-Im-β-ImPyPy
1025β)	5'-W T G C A T W-3'	HpImPyPyHp-γ-Py-β-ImPyPy
1025βp)	5'-W T G C A T W-3'	HpImPy-β-Hp-γ-Py-β-ImPyPy
1026β)	5'-W T G C A A W-3'	HpImPyPyPy-γ-Hp-β-ImPyPy
1026βp)	5'-W T G C A A W-3'	HpImPy-β-Py-γ-Hp-β-ImPyPy
1027β)	5'-W T G C A G W-3'	HpIm-β-PyIm-γ-Py-β-ImPyPy

TABLE 77 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
1028β)	5'-W T G C A C W-3'	HpImPyPyPy-γ-Im-β-ImPyP
1028βp)	5'-W T G C A C W-3'	HpImPy-β-Py-γ-Im-β-ImPyPy
1029β)	5'-W T G C G T W-3'	HpIm-β-ImHp-γ-Py-β-ImPyPy
1030β)	5'-W T G C G A W-3'	HpIm-β-ImPy-γ-Hp-β-ImPyPy
1031β)	5'-W T G C C T W-3'	HpImPyPyHp-γ-PyImIm-β-Py
1031βp)	5'-W T G C C T W-3'	HpImPy-β-Hp-γ-PyImIm-β-Py
1032β)	5'-W T G C C A W-3'	HpImPyPyPy-γ-HpImIm-β-Py
1032βp)	5'-W T G C C A W-3'	HpImPy-β-Py-γ-HpImIm-β-Py
1035β)	5'-W T G G C G W-3'	HpImIm-β-Im-γ-PyImPyPyPy
1036β)	5'-W T G G C C W-3'	HpImIm-β-Py-γ-ImImPyPyPy
1037β)	5'-W T G C G G W-3'	HpIm-β-ImIm-γ-Py-β-ImPyPy
1038β)	5'-W T G C G C W-3'	HpIm-β-ImPy-γ-Im-β-ImPyPy
1039β)	5'-W T G C C G W-3'	HpIm-β-PyIm-γ-PyImIm-β-Py
1040β)	5'-W T G C C C W-3'	HpImPyPyPy-γ-ImImIm-β-Py

TABLE 78: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTTWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
1043β)	5'-W T T T T G W-3'	HpHp-β-HpIm-γ-PyPyPyPyPy
1043βp)	5'-W T T T T G W-3'	HpHp-β-HpIm-γ-PyPy-β-PyPy
1047β)	5'-W T T T A G W-3'	HpHp-β-PyIm-γ-PyHpPyPyPy
1047βp)	5'-W T T T A G W-3'	HpHp-β-PyIm-γ-PyHp-β-PyPy
1049β)	5'-W T T T G T W-3'	HpHp-β-ImHp-γ-PyPyPyPyPy
1049βp)	5'-W T T T G T W-3'	HpHp-β-ImHp-γ-PyPy-β-PyPy
1050β)	5'-W T T T G A W-3'	HpHp-β-ImPy-γ-HpPyPyPyPy
1050βp)	5'-W T T T G A W-3'	HpHp-β-ImPy-γ-HpPy-β-PyPy
1051β)	5'-W T T T G G W-3'	HpHp-β-ImIm-γ-PyPyPyPyPy
1051βp)	5'-W T T T G G W-3'	HpHp-β-ImIm-γ-PyPy-β-PyPy
1052β)	5'-W T T T G C W-3'	HpHp-β-ImPy-γ-ImPyPyPyPy
1052βp)	5'-W T T T G C W-3'	HpHp-β-ImPy-γ-ImPy-β-PyPy
1055β)	5'-W T T T C G W-3'	HpHp-β-PyIm-γ-PyImPyPyPy
1055βp)	5'-W T T T C G W-3'	HpHp-β-PyIm-γ-PyIm-β-PyPy
1059β)	5'-W T T A T G W-3'	HpHp-β-HpIm-γ-PyPyHpPyPy
1059βp)	5'-W T T A T G W-3'	HpHp-β-HpIm-γ-PyPy-β-PyPy
1063β)	5'-W T T A A G W-3'	HpHp-β-PyIm-γ-PyHpHpPyPy
1063βp)	5'-W T T A A G W-3'	HpHp-β-PyIm-γ-PyHp-β-PyPy
1065β)	5'-W T T A G T W-3'	HpHp-β-ImHp-γ-PyPyHpPyPy
1065βp)	5'-W T T A G T W-3'	HpHp-β-ImHp-γ-PyPy-β-PyPy
1066β)	5'-W T T A G A W-3'	HpHp-β-ImPy-γ-HpPyHpPyPy
1066βp)	5'-W T T A G A W-3'	HpHp-β-ImPy-γ-HpPy-β-PyPy
1067β)	5'-W T T A G G W-3'	HpHp-β-ImIm-γ-PyPyHpPyPy
1067βp)	5'-W T T A G G W-3'	HpHp-β-ImIm-γ-PyPy-β-PyPy
1068β)	5'-W T T A G C W-3'	HpHp-β-ImPy-γ-ImPyHpPyPy
1068βp)	5'-W T T A G C W-3'	HpHp-β-ImPy-γ-ImPy-β-PyPy
1071β)	5'-W T T A C G W-3'	HpHp-β-PyIm-γ-PyImHpPyPy
1071βp)	5'-W T T A C G W-3'	HpHp-β-PyIm-γ-PyIm-β-PyPy

TABLE 79: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTTSNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
1073β)	5'-W T T G T T W-3'	Hp-β-ImHpHp-γ-PyPyPyPyPy
1073βp)	5'-W T T G T T W-3'	Hp-β-ImHpHp-γ-PyPyPy-β-Py
1074β)	5'-W T T G T A W-3'	Hp-β-ImHpPy-γ-HpPyPyPyPy
1074βp)	5'-W T T G T A W-3'	Hp-β-ImHpPy-γ-HpPyPy-β-Py
1075β)	5'-W T T G T G W-3'	Hp-β-ImHpIm-γ-PyPyPyPyPy
1075βp)	5'-W T T G T G W-3'	Hp-β-ImHpIm-γ-PyPyPy-β-Py
1076β)	5'-W T T G T C W-3'	Hp-β-ImHpPy-γ-ImPyPyPyPy
1076βp)	5'-W T T G T C W-3'	Hp-β-ImHpPy-γ-ImPyPy-β-Py
1077β)	5'-W T T G A T W-3'	Hp-β-ImPyHp-γ-PyHpPyPyPy
1077βp)	5'-W T T G A T W-3'	Hp-β-ImPyHp-γ-PyHpPy-β-Py
1078β)	5'-W T T G A A W-3'	Hp-β-ImPyPy-γ-HpHpPyPyPy
1078βp)	5'-W T T G A A W-3'	Hp-β-ImPyPy-γ-HpHpPy-β-Py
1079β)	5'-W T T G A G W-3'	Hp-β-ImPyIm-γ-PyHpPyPyPy
1079βp)	5'-W T T G A G W-3'	Hp-β-ImPyIm-γ-PyHpPy-β-Py
1080β)	5'-W T T G A C W-3'	Hp-β-ImPyPy-γ-ImHpPyPyPy
1080βp)	5'-W T T G A C W-3'	Hp-β-ImPyPy-γ-ImHpPy-β-Py
1081β)	5'-W T T G G T W-3'	Hp-β-ImImHp-γ-PyPyPyPyPy
1081βp)	5'-W T T G G T W-3'	Hp-β-ImImHp-γ-PyPyPy-β-Py
1082β)	5'-W T T G G A W-3'	Hp-β-ImImPy-γ-HpPyPyPyPy
1082βp)	5'-W T T G G A W-3'	Hp-β-ImImPy-γ-HpPyPy-β-Py
1083β)	5'-W T T G C T W-3'	Hp-β-ImPyHp-γ-PyImPyPyPy
1083βp)	5'-W T T G C T W-3'	Hp-β-ImPyHp-γ-PyImPy-β-Py
1084β)	5'-W T T G C A W-3'	Hp-β-ImPyPy-γ-HpImPyPyPy
1084βp)	5'-W T T G C A W-3'	Hp-β-ImPyPy-γ-HpImPy-β-Py
1085β)	5'-W T T G G G W-3'	Hp-β-ImImIm-γ-PyPyPyPyPy
1085βp)	5'-W T T G G G W-3'	Hp-β-ImImIm-γ-PyPyPy-β-Py
1086β)	5'-W T T G G C W-3'	Hp-β-ImImPy-γ-ImPyPyPyPy
1086βp)	5'-W T T G G C W-3'	Hp-β-ImImPy-γ-ImPyPy-β-Py
1087β)	5'-W T T G C G W-3'	Hp-β-ImPyIm-γ-PyImPyPyPy
1087βp)	5'-W T T G C G W-3'	Hp-β-ImPyIm-γ-PyImPy-β-Py

TABLE 79 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTTSNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
1088β)	5'-W T T G C C W-3'	Hp-β-ImPyPy-γ-ImImPyPyPy
1088βp)	5'-W T T G C C W-3'	Hp-β-ImPyPy-γ-ImImPy-β-Py
1089β)	5'-W T T C T T W-3'	HpHpPyHpHp-γ-Py-β-ImPyPy
1089βp)	5'-W T T C T T W-3'	HpHpPy-β-Hp-γ-Py-β-ImPyPy
1090β)	5'-W T T C T A W-3'	HpHpPyHpPy-γ-Hp-β-ImPyPy
1090βp)	5'-W T T C T A W-3'	HpHpPy-β-Py-γ-Hp-β-ImPyPy
1091β)	5'-W T T C T G W-3'	HpHp-β-HpIm-γ-Py-β-ImPyPy
1092β)	5'-W T T C T C W-3'	HpHpPyHpPy-γ-Im-β-ImPyPy
1092βp)	5'-W T T C T C W-3'	HpHpPy-β-Py-γ-Im-β-ImPyPy
1093β)	5'-W T T C A T W-3'	HpHpPyPyHp-γ-Py-β-ImPyPy
1093βp)	5'-W T T C A T W-3'	HpHpPy-β-Hp-γ-Py-β-ImPyPy
1094β)	5'-W T T C A A W-3'	HpHpPyPyPy-γ-Hp-β-ImPyPy
1094βp)	5'-W T T C A A W-3'	HpHpPy-β-Py-γ-Hp-β-ImPyPy
1095β)	5'-W T T C A G W-3'	HpHp-β-PyIm-γ-Py-β-ImPyPy
1096β)	5'-W T T C A C W-3'	HpHpPyPyPy-γ-Im-β-ImPyPy
1096βp)	5'-W T T C A C W-3'	HpHpPy-β-Py-γ-Im-β-ImPyPy
1097β)	5'-W T T C G T W-3'	HpHp-β-ImHp-γ-Py-β-ImPyPy
1098β)	5'-W T T C G A W-3'	HpHp-β-ImPy-γ-Hp-β-ImPyPy
1099β)	5'-W T T C C T W-3'	HpHpPyPyHp-γ-PyImIm-β-Py
1099βp)	5'-W T T C C T W-3'	Hp-β-PyPyHp-γ-PyImIm-β-Py
1100β)	5'-W T T C C A W-3'	HpHpPyPyPy-γ-HpImIm-β-Py
1100βp)	5'-W T T C C A W-3'	Hp-β-PyPyPy-γ-HpImIm-β-Py
1101β)	5'-W T T C G G W-3'	HpHp-β-ImIm-γ-Py-β-ImPyPy
1102β)	5'-W T T C G C W-3'	HpHp-β-ImPy-γ-Im-β-ImPyPy
1103β)	5'-W T T C C G W-3'	HpHp-β-PyIm-γ-PyImIm-β-Py

TABLE 80: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTAWNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
1107β)	5'-W T A T T G W-3'	HpPy-β-HpIm-γ-PyPyPyHpPy
1107βp)	5'-W T A T T G W-3'	HpPy-β-HpIm-γ-PyPy-β-HpPy
1111β)	5'-W T A T A G W-3'	HpPy-β-PyIm-γ-PyHpPyHpPy
1111βp)	5'-W T A T A G W-3'	HpPy-β-PyIm-γ-PyHp-β-HpPy
1113β)	5'-W T A T G T W-3'	HpPy-β-ImHp-γ-PyPyPyHpPy
1113βp)	5'-W T A T G T W-3'	HpPy-β-ImHp-γ-PyPy-β-HpPy
1114β)	5'-W T A T G A W-3'	HpPy-β-ImPy-γ-HpPyPyHpPy
1114βp)	5'-W T A T G A W-3'	HpPy-β-ImPy-γ-HpPy-β-HpPy
1115β)	5'-W T A T G G W-3'	HpPy-β-ImIm-γ-PyPyPyHpPy
1115βp)	5'-W T A T G G W-3'	HpPy-β-ImIm-γ-PyPy-β-HpPy
1116β)	5'-W T A T G C W-3'	HpPy-β-ImPy-γ-ImPyPyHpPy
1116βp)	5'-W T A T G C W-3'	HpPy-β-ImPy-γ-ImPy-β-HpPy
1119β)	5'-W T A T C G W-3'	HpPy-β-PyIm-γ-PyImPyHpPy
1119βp)	5'-W T A T C G W-3'	HpPy-β-PyIm-γ-PyIm-β-HpPy
1123β)	5'-W T A A T G W-3'	HpPy-β-HpIm-γ-PyPyHpHpPy
1123βp)	5'-W T A A T G W-3'	HpPy-β-HpIm-γ-PyPy-β-HpPy
1127β)	5'-W T A A A G W-3'	HpPy-β-PyIm-γ-PyHpHpHpPy
1127βp)	5'-W T A A A G W-3'	HpPy-β-PyIm-γ-PyHp-β-HpPy
1129β)	5'-W T A A G T W-3'	HpPy-β-ImHp-γ-PyPyHpHpPy
1129βp)	5'-W T A A G T W-3'	HpPy-β-ImHp-γ-PyPy-β-HpPy
1130β)	5'-W T A A G A W-3'	HpPy-β-ImPy-γ-HpPyHpHpPy
1130βp)	5'-W T A A G A W-3'	HpPy-β-ImPy-γ-HpPy-β-HpPy
1131β)	5'-W T A A G G W-3'	HpPy-β-ImIm-γ-PyPyHpHpPy
1131βp)	5'-W T A A G G W-3'	HpPy-β-ImIm-γ-PyPy-β-HpPy
1132β)	5'-W T A A G C W-3'	HpPy-β-ImPy-γ-ImPyHpHpPy
1132βp)	5'-W T A A G C W-3'	HpPy-β-ImPy-γ-ImPy-β-HpPy
1135β)	5'-W T A A C G W-3'	HpPy-β-PyIm-γ-PyImHpHpPy
1135βp)	5'-W T A A C G W-3'	HpPy-β-PyIm-γ-PyIm-β-HpPy

TABLE 81: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTASNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
1137β)	5'-W T A G T T W-3'	Hp-β-ImHpHp-γ-PyPyPyHpPy
1137βp)	5'-W T A G T T W-3'	Hp-β-ImHpHp-γ-PyPyPy-β-Py
1138β)	5'-W T A G T A W-3'	Hp-β-ImHpPy-γ-HpPyPyHpPy
1138βp)	5'-W T A G T A W-3'	Hp-β-ImHpPy-γ-HpPyPy-β-Py
1139β)	5'-W T A G T G W-3'	Hp-β-ImHpIm-γ-PyPyPyHpPy
1139βp)	5'-W T A G T G W-3'	Hp-β-ImHpIm-γ-PyPyPy-β-Py
1140β)	5'-W T A G T C W-3'	Hp-β-ImHpPy-γ-ImPyPyHpPy
1140βp)	5'-W T A G T C W-3'	Hp-β-ImHpPy-γ-ImPyPy-β-Py
1141β)	5'-W T A G A T W-3'	Hp-β-ImPyHp-γ-PyHpPyHpPy
1141βp)	5'-W T A G A T W-3'	Hp-β-ImPyHp-γ-PyHpPy-β-Py
1142β)	5'-W T A G A A W-3'	Hp-β-ImPyPy-γ-HpHpPyHpPy
1142βp)	5'-W T A G A A W-3'	Hp-β-ImPyPy-γ-HpHpPy-β-Py
1143β)	5'-W T A G A G W-3'	Hp-β-ImPyIm-γ-PyHpPyHpPy
1143βp)	5'-W T A G A G W-3'	Hp-β-ImPyIm-γ-PyHpPy-β-Py
1144β)	5'-W T A G A C W-3'	Hp-β-ImPyPy-γ-ImHpPyHpPy
1144βp)	5'-W T A G A C W-3'	Hp-β-ImPyPy-γ-ImHpPy-β-Py
1145β)	5'-W T A G G T W-3'	Hp-β-ImImHp-γ-PyPyPyHpPy
1145βp)	5'-W T A G G T W-3'	Hp-β-ImImHp-γ-PyPyPy-β-Py
1146β)	5'-W T A G G A W-3'	Hp-β-ImImPy-γ-HpPyPyHpPy
1146βp)	5'-W T A G G A W-3'	Hp-β-ImImPy-γ-HpPyPy-β-Py
1147β)	5'-W T A G C T W-3'	Hp-β-ImPyHp-γ-PyImPyHpPy
1147βp)	5'-W T A G C T W-3'	Hp-β-ImPyHp-γ-PyImPy-β-Py
1148β)	5'-W T A G C A W-3'	Hp-β-ImPyPy-γ-HpImPyHpPy
1148βp)	5'-W T A G C A W-3'	Hp-β-ImPyPy-γ-HpImPy-β-Py
1149β)	5'-W T A G G G W-3'	Hp-β-ImImIm-γ-PyPyPyHpPy
1149βp)	5'-W T A G G G W-3'	Hp-β-ImImIm-γ-PyPyPy-β-Py
1150β)	5'-W T A G G C W-3'	Hp-β-ImImPy-γ-ImPyPyHpPy
1150βp)	5'-W T A G G C W-3'	Hp-β-ImImPy-γ-ImPyPy-β-Py
1151β)	5'-W T A G C G W-3'	Hp-β-ImPyIm-γ-PyImPyHpPy
1151βp)	5'-W T A G C G W-3'	Hp-β-ImPyIm-γ-PyImPy-β-Py

TABLE 81 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTASNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
1152β)	5'-W T A G C C W-3'	Hp-β-ImPyPy-γ-ImImPyHpPy
1152βp)	5'-W T A G C C W-3'	Hp-β-ImPyPy-γ-ImImPy-β-Py
1153β)	5'-W T A C T T W-3'	HpPyPyHpHp-γ-Py-β-ImHpPy
1153βp)	5'-W T A C T T W-3'	HpPyPy-β-Hp-γ-Py-β-ImHpPy
1154β)	5'-W T A C T A W-3'	HpPyPyHpPy-γ-Hp-β-ImHpPy
1154βp)	5'-W T A C T A W-3'	HpPyPy-β-Py-γ-Hp-β-ImHpPy
1155β)	5'-W T A C T G W-3'	HpPy-β-HpIm-γ-Py-β-ImHpPy
1156β)	5'-W T A C T C W-3'	HpPyPyHpPy-γ-Im-β-ImHpPy
1156βp)	5'-W T A C T C W-3'	HpPyPy-β-Py-γ-Im-β-ImHpPy
1157β)	5'-W T A C A T W-3'	HpPyPyPyHp-γ-Py-β-ImHpPy
1157βp)	5'-W T A C A T W-3'	HpPyPy-β-Hp-γ-Py-β-ImHpPy
1158β)	5'-W T A C A A W-3'	HpPyPyPyPy-γ-Hp-β-ImHpPy
1158βp)	5'-W T A C A A W-3'	HpPyPy-β-Py-γ-Hp-β-ImHpPy
1159β)	5'-W T A C A G W-3'	HpPy-β-PyIm-γ-Py-β-ImHpPy
1160β)	5'-W T A C A C W-3'	HpPyPyPyPy-γ-Im-β-ImHpPy
1160βp)	5'-W T A C A C W-3'	HpPyPy-β-Py-γ-Im-β-ImHpPy
1161β)	5'-W T A C G T W-3'	HpPy-β-ImHp-γ-Py-β-ImHpPy
1162β)	5'-W T A C G A W-3'	HpPy-β-ImPy-γ-Hp-β-ImHpPy
1163β)	5'-W T A C C T W-3'	HpPyPyPyHp-γ-PyImIm-β-Py
1163βp)	5'-W T A C C T W-3'	Hp-β-PyPyHp-γ-PyImIm-β-Py
1164β)	5'-W T A C C A W-3'	HpPyPyPyPy-γ-HpImIm-β-Py
1164βp)	5'-W T A C C A W-3'	Hp-β-PyPyPy-γ-HpImIm-β-Py
1165β)	5'-W T A C G G W-3'	HpPy-β-ImIm-γ-Py-β-ImHpPy
1166β)	5'-W T A C G C W-3'	HpPy-β-ImPy-γ-Im-β-ImHpPy
1167β)	5'-W T A C C G W-3'	HpPy-β-PyIm-γ-PyImIm-β-Py

TABLE 82: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCWNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
1170β)	5'-W T C T T A W-3'	HpPyHpHpPy-γ-HpPy-β-ImPy
1170βp)	5'-W T C T T A W-3'	HpPy-β-HpPy-γ-HpPy-β-ImPy
1171β)	5'-W T C T T G W-3'	HpPy-β-HpIm-γ-PyPy-β-ImPy
1172β)	5'-W T C T T C W-3'	HpPyHpHpPy-γ-ImPy-β-ImPy
1172βp)	5'-W T C T T C W-3'	HpPy-β-HpPy-γ-ImPy-β-ImPy
1173β)	5'-W T C T A T W-3'	HpPyHpPyHp-γ-PyHp-β-ImPy
1173βp)	5'-W T C T A T W-3'	HpPy-β-PyHp-γ-PyHp-β-ImPy
1174β)	5'-W T C T A A W-3'	HpPyHpPyPy-γ-HpHp-β-ImPy
1174βp)	5'-W T C T A A W-3'	HpPy-β-PyPy-γ-HpHp-β-ImPy
1175β)	5'-W T C T A G W-3'	HpPy-β-PyIm-γ-PyHp-β-ImPy
1176β)	5'-W T C T A C W-3'	HpPyHpPyPy-γ-ImHp-β-ImPy
1176βp)	5'-W T C T A C W-3'	HpPy-β-PyPy-γ-ImHp-β-ImPy
1177β)	5'-W T C T G T W-3'	HpPy-β-ImHp-γ-PyPy-β-ImPy
1178β)	5'-W T C T G A W-3'	HpPy-β-ImPy-γ-HpPy-β-ImPy
1179β)	5'-W T C T G G W-3'	HpPy-β-ImIm-γ-PyPy-β-ImPy
1180β)	5'-W T C T G C W-3'	HpPy-β-ImPy-γ-ImPy-β-ImPy
1181β)	5'-W T C T C T W-3'	HpPyHpPyHp-γ-PyIm-β-ImPy
1181βp)	5'-W T C T C T W-3'	HpPy-β-PyHp-γ-PyIm-β-ImPy
1182β)	5'-W T C T C A W-3'	HpPyHpPyPy-γ-HpIm-β-ImPy
1182βp)	5'-W T C T C A W-3'	HpPy-β-PyPy-γ-HpIm-β-ImPy
1183β)	5'-W T C T C G W-3'	HpPy-β-PyIm-γ-PyIm-β-ImPy
1184β)	5'-W T C T C C W-3'	HpPyHpPyPy-γ-ImIm-β-ImPy
1184βp)	5'-W T C T C C W-3'	HpPy-β-PyPy-γ-ImIm-β-ImPy
1185β)	5'-W T C A T T W-3'	HpPyPyHpHp-γ-PyPy-β-ImPy
1185βp)	5'-W T C A T T W-3'	HpPy-β-HpHp-γ-PyPy-β-ImPy
1186β)	5'-W T C A T A W-3'	HpPyPyHpPy-γ-HpPy-β-ImPy
1186βp)	5'-W T C A T A W-3'	HpPy-β-HpPy-γ-HpPy-β-ImPy
1187β)	5'-W T C A T G W-3'	HpPy-β-HpIm-γ-PyPy-β-ImPy

TABLE 82 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCWNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
1188β)	5'-W T C A T C W-3'	HpPyPyHpPy-γ-ImPy-β-ImPy
1188βp)	5'-W T C A T C W-3'	HpPy-β-HpPy-γ-ImPy-β-ImPy
1189β)	5'-W T C A A T W-3'	HpPyPyPyHp-γ-PyHp-β-ImPy
1189βp)	5'-W T C A A T W-3'	HpPy-β-PyHp-γ-PyHp-β-ImPy
1190β)	5'-W T C A A A W-3'	HpPyPyPyPy-γ-HpHp-β-ImPy
1190βp)	5'-W T C A A A W-3'	HpPy-β-PyPy-γ-HpHp-β-ImPy
1191β)	5'-W T C A A G W-3'	HpPy-β-PyIm-γ-PyHp-β-ImPy
1192β)	5'-W T C A A C W-3'	HpPyPyPyPy-γ-ImHp-β-ImPy
1192βp)	5'-W T C A A C W-3'	HpPy-β-PyPy-γ-ImHp-β-ImPy
1193β)	5'-W T C A G T W-3'	HpPy-β-ImHp-γ-PyPy-β-ImPy
1194β)	5'-W T C A G A W-3'	HpPy-β-ImPy-γ-HpPy-β-ImPy
1195β)	5'-W T C A G G W-3'	HpPy-β-ImIm-γ-PyPy-β-ImPy
1196β)	5'-W T C A G C W-3'	HpPy-β-ImPy-γ-ImPy-β-ImPy
1197β)	5'-W T C A C T W-3'	HpPyPyPyHp-γ-PyIm-β-ImPy
1197βp)	5'-W T C A C T W-3'	HpPy-β-PyHp-γ-PyIm-β-ImPy
1198β)	5'-W T C A C A W-3'	HpPyPyPyPy-γ-HpIm-β-ImPy
1198βp)	5'-W T C A C A W-3'	HpPy-β-PyPy-γ-HpIm-β-ImPy
1199β)	5'-W T C A C G W-3'	HpPy-β-PyIm-γ-PyIm-β-ImPy
1200β)	5'-W T C A C C W-3'	HpPyPyPyPy-γ-ImIm-β-ImPy
1200βp)	5'-W T C A C C W-3'	HpPy-β-PyPy-γ-ImIm-β-ImPy

TABLE 83: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCSNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
1201β)	5'-W T C G T T W-3'	Hp-β-ImHpHp-γ-PyPy-β-ImPy
1202β)	5'-W T C G T A W-3'	Hp-β-ImHpPy-γ-HpPy-β-ImPy
1203β)	5'-W T C G T G W-3'	Hp-β-ImHpIm-γ-PyPy-β-ImPy
1204β)	5'-W T C G T C W-3'	Hp-β-ImHpPy-γ-ImPy-β-ImPy
1205β)	5'-W T C G A T W-3'	Hp-β-ImPyHp-γ-PyHp-β-ImPy
1206β)	5'-W T C G A A W-3'	Hp-β-ImPyPy-γ-HpHp-β-ImPy
1207β)	5'-W T C G A G W-3'	Hp-β-ImPyIm-γ-PyHp-β-ImPy
1208β)	5'-W T C G A C W-3'	Hp-β-ImPyPy-γ-ImHp-β-ImPy
1209β)	5'-W T C G G T W-3'	Hp-β-ImImHp-γ-PyPy-β-ImPy
1210β)	5'-W T C G G A W-3'	Hp-β-ImImPy-γ-HpPy-β-ImPy
1211β)	5'-W T C G C T W-3'	Hp-β-ImPyHp-γ-PyIm-β-ImPy
1212β)	5'-W T C G C A W-3'	Hp-β-ImPyPy-γ-HpIm-β-ImPy
1213β)	5'-W T C C T T W-3'	HpPyPyHpHp-γ-Py-β-ImImPy
1213βp)	5'-W T C C T T W-3'	HpPyPy-β-Hp-γ-Py-β-ImImPy
1214β)	5'-W T C C T A W-3'	HpPyPyHpPy-γ-Hp-β-ImImPy
1214βp)	5'-W T C C T A W-3'	HpPyPy-β-Py-γ-Hp-β-ImImPy
1215β)	5'-W T C C T G W-3'	HpPy-β-HpIm-γ-Py-β-ImImPy
1216β)	5'-W T C C T C W-3'	HpPyPyHpPy-γ-Im-β-ImImPy
1216βp)	5'-W T C C T C W-3'	HpPyPy-β-Py-γ-Im-β-ImImPy
1217β)	5'-W T C C A T W-3'	HpPyPyPyHp-γ-Py-β-ImImPy
1217βp)	5'-W T C C A T W-3'	HpPyPy-β-Hp-γ-Py-β-ImImPy
1218β)	5'-W T C C A A W-3'	HpPyPyPyPy-γ-Hp-β-ImImPy
1218βp)	5'-W T C C A A W-3'	HpPyP-β-Py-γ-Hp-β-ImImPy
1219β)	5'-W T C C A G W-3'	HpPy-β-PyIm-γ-Py-β-ImImPy
1220β)	5'-W T C C A C W-3'	HpPyPyPyPy-γ-Im-β-ImImPy
1220βp)	5'-W T C C A C W-3'	HpPyPy-β-Py-γ-Im-β-ImImPy
1221β)	5'-W T C C G T W-3'	HpPy-β-ImHp-γ-Py-β-ImImPy
1222β)	5'-W T C C G A W-3'	HpPy-β-ImPy-γ-Hp-β-ImImPy
1225β)	5'-W T C G G G W-3'	Hp-β-ImImIm-γ-PyPy-β-ImPy

TABLE 83 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCSNNW-3' with β substitutions

DNA sequence	aromatic amino acid sequence
1226β) 5'-W T C G G C W-3'	Hp-β-ImImPy-γ-ImPy-β-ImPy
1227β) 5'-W T C G C G W-3'	Hp-β-ImPyIm-γ-PyIm-β-ImPy
1228β) 5'-W T C G C C W-3'	Hp-β-ImPyPy-γ-ImIm-β-ImPy
1229β) 5'-W T C C G G W-3'	HpPy-β-ImIm-γ-Py-β-ImImPy
1230β) 5'-W T C C G C W-3'	HpPy-β-ImPy-γ-Im-β-ImImPy
1231β) 5'-W T C C C G W-3'	HpPy-β-PyIm-γ-PyImImImPy

If the process described above of designing a preferred polyamide molecule comprising four or five carboxamide binding pairs does not produce a selective polyamide that binds to the target identified DNA sequence with subnanomolar affinity and with a selectivity over mismatch sequences of greater than a factor of ten, a polyamide molecule

$X_1X_2X_3X_4X_5X_6$-γ-$X_7X_8X_9X_{10}X_{11}X_{12}$ having six carboxamide binding pairs can be designed that is selective for an eight base pair identified target 5'-WNNNNNNW-3' sequence. The design and synthesis of six binding pair polyamides is essentially the same as that of the four and five binding pair polyamides described above.

The polyamide design process for six carboxamide binding pair polyamides is shown schematically in Figure 10 A and the upper half of 10B. The method for chosing the residues that can be replaced by a β-alanine residue is shown schematically in the lower half of Figure 10 B and in Figure 11. The 1024 possible 12-ring hairpins which target the 1024 5'-GNNNNN-3' core sequences are listed in Tables 84-115. Each DNA sequence entry can be correlated to its corresponding polyamide recognition sequence using the process outlined in this figure. The 1024 possible 12-ring hairpins which target the 1024 5'-CNNNNN-3' core sequences are listed in Tables 116-147. Each DNA sequence entry can be correlated to its corresponding polyamide recognition sequence using the process outlined in this figure.

Figure 11 shows a process for replacement of aromatic amino acid residues with aliphatic β-alanine 'spring' residues in order to enhance the DNA binding properties of 12-ring hairpin polyamides. Selective placement of an aliphatic β-alanine (β) residue paired side-by-side with either a pyrrole (Py) or imidazole (Im) aromatic amino acid or another β-alanine residue is found

to compensate for sequence composition effects for recognition of the minor groove of DNA by hairpin pyrrole-imidazole polyamides. If an all-ring polyamide has been found to have an affinity which is not subnanomolar, or a specificity versus mismatch sequences which is less than 10-fold it may be caused by DNA sequence-composition effects which can be tuned out by replacement of an aromatic amino acid with an aliphatic β-alanine spring. Rules have been determined to help determine the exact placement of the β-spring residues. For example, within the 12-ring template, it is only beneficial to place β-alanine within positions X_2, X_3, X_4, X_5, X_8, X_9, and X_{10} X_{11},. No more than two β-alanine residues may be placed within a single hairpin structure. No more than a single β-residue may be placed within each individual polyamide subunit. Tables 148-1079 list derivatives of sequences (1233-2224) labeled (1223β-2224β) which contain two β-alanine residues assigned according to the process outlined in Figure 11A & B.

TABLE 84: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGGWNNW-3'

	DNA sequence	aromatic amino acid sequence
1233)	5'-W G G G T T T W-3'	ImImImHpHpHp-γ-PyPyPyPyPyPy
1234)	5'-W G G G T T A W-3'	ImImImHpHpPy-γ-HpPyPyPyPyPy
1235)	5'-W G G G T T G W-3'	ImImImHpHpIm-γ-PyPyPyPyPyPy
1236)	5'-W G G G T T C W-3'	ImImImHpHpPy-γ-ImPyPyPyPyPy
1237)	5'-W G G G T A T W-3'	ImImImHpPyHp-γ-PyHpPyPyPyPy
1238)	5'-W G G G T A A W-3'	ImImImHpPyPy-γ-HpHpPyPyPyPy
1239)	5'-W G G G T A G W-3'	ImImImHpPyIm-γ-PyHpPyPyPyPy
1240)	5'-W G G G T A C W-3'	ImImImHpPyPy-γ-ImHpPyPyPyPy
1241)	5'-W G G G T G T W-3'	ImImImHpImHp-γ-PyPyPyPyPyPy
1242)	5'-W G G G T G A W-3'	ImImImHpImPy-γ-HpPyPyPyPyPy
1243)	5'-W G G G T G G W-3'	ImImImHpImIm-γ-PyPyPyPyPyPy
1244)	5'-W G G G T G C W-3'	ImImImHpImPy-γ-ImPyPyPyPyPy
1245)	5'-W G G G T C T W-3'	ImImImHpPyHp-γ-PyImPyPyPyPy
1246)	5'-W G G G T C A W-3'	ImImImHpPyPy-γ-HpImPyPyPyPy
1247)	5'-W G G G T C G W-3'	ImImImHpPyIm-γ-PyImPyPyPyPy
1248)	5'-W G G G T C C W-3'	ImImImHpPyPy-γ-ImImPyPyPyPy
1249)	5'-W G G G A T T W-3'	ImImImPyHpHp-γ-PyPyHpPyPyPy
1250)	5'-W G G G A T A W-3'	ImImImPyHpPy-γ-HpPyHpPyPyPy
1251)	5'-W G G G A T G W-3'	ImImImPyHpIm-γ-PyPyHpPyPyPy
1252)	5'-W G G G A T C W-3'	ImImImPyHpPy-γ-ImPyHpPyPyPy
1253)	5'-W G G G A A T W-3'	ImImImPyPyHp-γ-PyHpHpPyPyPy
1254)	5'-W G G G A A A W-3'	ImImImPyPyPy-γ-HpHpHpPyPyPy
1255)	5'-W G G G A A G W-3'	ImImImPyPyIm-γ-PyHpHpPyPyPy
1256)	5'-W G G G A A C W-3'	ImImImPyPyPy-γ-ImHpHpPyPyPy
1257)	5'-W G G G A G T W-3'	ImImImPyImHp-γ-PyPyHpPyPyPy
1258)	5'-W G G G A G A W-3'	ImImImPyImPy-γ-HpPyHpPyPyPy
1259)	5'-W G G G A G G W-3'	ImImImPyImIm-γ-PyPyHpPyPyPy
1260)	5'-W G G G A G C W-3'	ImImImPyImPy-γ-ImPyHpPyPyPy
1261)	5'-W G G G A C T W-3'	ImImImPyPyHp-γ-PyImHpPyPyPy
1262)	5'-W G G G A C A W-3'	ImImImPyPyPy-γ-HpImHpPyPyPy
1263)	5'-W G G G A C G W-3'	ImImImPyPyIm-γ-PyImHpPyPyPy
1264)	5'-W G G G A C C W-3'	ImImImPyPyPy-γ-ImImHpPyPyPy

TABLE 85: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGGSNNW-3'

	DNA sequence	aromatic amino acid sequence
1265)	5'-W G G G G T T W-3'	ImImImImHpHp-γ-PyPyPyPyPyPy
1266)	5'-W G G G G T A W-3'	ImImImImHpPy-γ-HpPyPyPyPyPy
1267)	5'-W G G G G T G W-3'	ImImImImHpIm-γ-PyPyPyPyPyPy
1268)	5'-W G G G G T C W-3'	ImImImImHpPy-γ-ImPyPyPyPyPy
1269)	5'-W G G G G A T W-3'	ImImImImPyHp-γ-PyHpPyPyPyPy
1270)	5'-W G G G G A A W-3'	ImImImImPyPy-γ-HpHpPyPyPyPy
1271)	5'-W G G G G A G W-3'	ImImImImPyIm-γ-PyHpPyPyPyPy
1272)	5'-W G G G G A C W-3'	ImImImImPyPy-γ-ImHpPyPyPyPy
1273)	5'-W G G G G G T W-3'	ImImImImImHp-γ-PyPyPyPyPyPy
1274)	5'-W G G G G G A W-3'	ImImImImImPy-γ-HpPyPyPyPyPy
1275)	5'-W G G G G C T W-3'	ImImImImPyHp-γ-PyImPyPyPyPy
1276)	5'-W G G G G C A W-3'	ImImImImPyPy-γ-HpImPyPyPyPy
1277)	5'-W G G G C T T W-3'	ImImImPyHpHp-γ-PyPyImPyPyPy
1278)	5'-W G G G C T A W-3'	ImImImPyHpPy-γ-HpPyImPyPyPy
1279)	5'-W G G G C T G W-3'	ImImImPyHpIm-γ-PyPyImPyPyPy
1280)	5'-W G G G C T C W-3'	ImImImPyHpPy-γ-ImPyImPyPyPy
1281)	5'-W G G G C A T W-3'	ImImImPyPyHp-γ-PyHpImPyPyPy
1282)	5'-W G G G C A A W-3'	ImImImPyPyPy-γ-HpHpImPyPyPy
1283)	5'-W G G G C A G W-3'	ImImImPyPyIm-γ-PyHpImPyPyPy
1284)	5'-W G G G C A C W-3'	ImImImPyPyPy-γ-ImHpImPyPyPy
1285)	5'-W G G G C G T W-3'	ImImImPyImHp-γ-PyPyImPyPyPy
1286)	5'-W G G G C G A W-3'	ImImImPyImPy-γ-HpPyImPyPyPy
1287)	5'-W G G G C C T W-3'	ImImImPyPyHp-γ-PyImImPyPyPy
1288)	5'-W G G G C C A W-3'	ImImImPyPyPy-γ-HpImImPyPyPy
G49)	5'-W G G G G G G W-3'	ImImImImImIm-γ-PyPyPyPyPyPy
G50)	5'-W G G G G G C W-3'	ImImImImImPy-γ-ImPyPyPyPyPy
G51)	5'-W G G G G C G W-3'	ImImImImPyIm-γ-PyImPyPyPyPy
G52)	5'-W G G G G C C W-3'	ImImImImPyPy-γ-ImImPyPyPyPy
G53)	5'-W G G G C G G W-3'	ImImImPyImIm-γ-PyPyImPyPyPy
G54)	5'-W G G G C G C W-3'	ImImImPyImPy-γ-ImPyImPyPyPy
G55)	5'-W G G G C C G W-3'	ImImImPyPyIm-γ-PyImImPyPyPy
G56)	5'-W G G G C C C W-3'	ImImImPyPyPy-γ-ImImImPyPyPy

TABLE 86: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGTWNNW-3'

	DNA sequence	aromatic amino acid sequence
1289)	5'-W G G T T T T W-3'	ImImHpHpHpHp-γ-PyPyPyPyPyPy
1290)	5'-W G G T T T A W-3'	ImImHpHpHpPy-γ-HpPyPyPyPyPy
1291)	5'-W G G T T T G W-3'	ImImHpHpHpIm-γ-PyPyPyPyPyPy
1292)	5'-W G G T T T C W-3'	ImImHpHpHpPy-γ-ImPyPyPyPyPy
1293)	5'-W G G T T A T W-3'	ImImHpHpPyHp-γ-PyHpPyPyPyPy
1294)	5'-W G G T T A A W-3'	ImImHpHpPyPy-γ-HpHpPyPyPyPy
1295)	5'-W G G T T A G W-3'	ImImHpHpPyIm-γ-PyHpPyPyPyPy
1296)	5'-W G G T T A C W-3'	ImImHpHpPyPy-γ-ImHpPyPyPyPy
1297)	5'-W G G T T G T W-3'	ImImHpHpImHp-γ-PyPyPyPyPyPy
1298)	5'-W G G T T G A W-3'	ImImHpHpImPy-γ-HpPyPyPyPyPy
1299)	5'-W G G T T G G W-3'	ImImHpHpImIm-γ-PyPyPyPyPyPy
1300)	5'-W G G T T G C W-3'	ImImHpHpImPy-γ-ImPyPyPyPyPy
1301)	5'-W G G T T C T W-3'	ImImHpHpPyHp-γ-PyImPyPyPyPy
1302)	5'-W G G T T C A W-3'	ImImHpHpPyPy-γ-HpImPyPyPyPy
1303)	5'-W G G T T C G W-3'	ImImHpHpPyIm-γ-PyImPyPyPyPy
1304)	5'-W G G T T C C W-3'	ImImHpHpPyPy-γ-ImImPyPyPyPy
1305)	5'-W G G T A T T W-3'	ImImHpPyHpHp-γ-PyPyHpPyPyPy
1306)	5'-W G G T A T A W-3'	ImImHpPyHpPy-γ-HpPyHpPyPyPy
1307)	5'-W G G T A T G W-3'	ImImHpPyHpIm-γ-PyPyHpPyPyPy
1308)	5'-W G G T A T C W-3'	ImImHpPyHpPy-γ-ImPyHpPyPyPy
1309)	5'-W G G T A A T W-3'	ImImHpPyPyHp-γ-PyHpHpPyPyPy
1310)	5'-W G G T A A A W-3'	ImImHpPyPyPy-γ-HpHpHpPyPyPy
1311)	5'-W G G T A A G W-3'	ImImHpPyPyIm-γ-PyHpHpPyPyPy
1312)	5'-W G G T A A C W-3'	ImImHpPyPyPy-γ-ImHpHpPyPyPy
1313)	5'-W G G T A G T W-3'	ImImHpPyImHp-γ-PyPyHpPyPyPy
1314)	5'-W G G T A G A W-3'	ImImHpPyImPy-γ-HpPyHpPyPyPy
1315)	5'-W G G T A G G W-3'	ImImHpPyImIm-γ-PyPyHpPyPyPy
1316)	5'-W G G T A G C W-3'	ImImHpPyImPy-γ-ImPyHpPyPyPy
1317)	5'-W G G T A C T W-3'	ImImHpPyPyHp-γ-PyImHpPyPyPy
1318)	5'-W G G T A C A W-3'	ImImHpPyPyPy-γ-HpImHpPyPyPy
1319)	5'-W G G T A C G W-3'	ImImHpPyPyIm-γ-PyImHpPyPyPy
1320)	5'-W G G T A C C W-3'	ImImHpPyPyPy-γ-ImImHpPyPyPy

TABLE 87: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGTSNNW-3'

	DNA sequence	aromatic amino acid sequence
1321)	5'-W G G T G T T W-3'	ImImHpImHpHp-γ-PyPyPyPyPyPy
1322)	5'-W G G T G T A W-3'	ImImHpImHpPy-γ-HpPyPyPyPyPy
1323)	5'-W G G T G T G W-3'	ImImHpImHpIm-γ-PyPyPyPyPyPy
1324)	5'-W G G T G T C W-3'	ImImHpImHpPy-γ-ImPyPyPyPyPy
1325)	5'-W G G T G A T W-3'	ImImHpImPyHp-γ-PyHpPyPyPyPy
1326)	5'-W G G T G A A W-3'	ImImHpImPyPy-γ-HpHpPyPyPyPy
1327)	5'-W G G T G A G W-3'	ImImHpImPyIm-γ-PyHpPyPyPyPy
1328)	5'-W G G T G A C W-3'	ImImHpImPyPy-γ-ImHpPyPyPyPy
1329)	5'-W G G T G G T W-3'	ImImHpImImHp-γ-PyPyPyPyPyPy
1330)	5'-W G G T G G A W-3'	ImImHpImImPy-γ-HpPyPyPyPyPy
1331)	5'-W G G T G C T W-3'	ImImHpImPyHp-γ-PyImPyPyPyPy
1332)	5'-W G G T G C A W-3'	ImImHpImPyPy-γ-HpImPyPyPyPy
1333)	5'-W G G T G G G W-3'	ImImHpImImIm-γ-PyPyPyPyPyPy
1334)	5'-W G G T G G C W-3'	ImImHpImImPy-γ-ImPyPyPyPyPy
1335)	5'-W G G T G C G W-3'	ImImHpImPyIm-γ-PyImPyPyPyPy
1336)	5'-W G G T G C C W-3'	ImImHpImPyPy-γ-ImImPyPyPyPy
1337)	5'-W G G T C T T W-3'	ImImHpPyHpHp-γ-PyPyImPyPyPy
1338)	5'-W G G T C T A W-3'	ImImHpPyHpPy-γ-HpPyImPyPyPy
1339)	5'-W G G T C T G W-3'	ImImHpPyHpIm-γ-PyPyImPyPyPy
1340)	5'-W G G T C T C W-3'	ImImHpPyHpPy-γ-ImPyImPyPyPy
1341)	5'-W G G T C A T W-3'	ImImHpPyPyHp-γ-PyHpImPyPyPy
1342)	5'-W G G T C A A W-3'	ImImHpPyPyPy-γ-HpHpImPyPyPy
1343)	5'-W G G T C A G W-3'	ImImHpPyPyIm-γ-PyHpImPyPyPy
1344)	5'-W G G T C A C W-3'	ImImHpPyPyPy-γ-ImHpImPyPyPy
1345)	5'-W G G T C G T W-3'	ImImHpPyImHp-γ-PyPyImPyPyPy
1346)	5'-W G G T C G A W-3'	ImImHpPyImPy-γ-HpPyImPyPyPy
1347)	5'-W G G T C C T W-3'	ImImHpPyPyHp-γ-PyImImPyPyPy
1348)	5'-W G G T C C A W-3'	ImImHpPyPyPy-γ-HpImImPyPyPy
1349)	5'-W G G T C G G W-3'	ImImHpPyImIm-γ-PyPyImPyPyPy
1350)	5'-W G G T C G C W-3'	ImImHpPyImPy-γ-ImPyImPyPyPy
1351)	5'-W G G T C C G W-3'	ImImHpPyPyIm-γ-PyImImPyPyPy
1352)	5'-W G G T C C C W-3'	ImImHpPyPyPy-γ-ImImImPyPyPy

TABLE 88: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGAWNNW-3'

	DNA sequence	aromatic amino acid sequence
1353)	5'-W G G A T T T W-3'	ImImPyHpHpHp-γ-PyPyPyHpPyPy
1354)	5'-W G G A T T A W-3'	ImImPyHpHpPy-γ-HpPyPyHpPyPy
1355)	5'-W G G A T T G W-3'	ImImPyHpHpIm-γ-PyPyPyHpPyPy
1356)	5'-W G G A T T C W-3'	ImImPyHpHpPy-γ-ImPyPyHpPyPy
1357)	5'-W G G A T A T W-3'	ImImPyHpPyHp-γ-PyHpPyHpPyPy
1358)	5'-W G G A T A A W-3'	ImImPyHpPyPy-γ-HpHpPyHpPyPy
1359)	5'-W G G A T A G W-3'	ImImPyHpPyIm-γ-PyHpPyHpPyPy
1360)	5'-W G G A T A C W-3'	ImImPyHpPyPy-γ-ImHpPyHpPyPy
1361)	5'-W G G A T G T W-3'	ImImPyHpImHp-γ-PyPyPyHpPyPy
1362)	5'-W G G A T G A W-3'	ImImPyHpImPy-γ-HpPyPyHpPyPy
1363)	5'-W G G A T G G W-3'	ImImPyHpImIm-γ-PyPyPyHpPyPy
1364)	5'-W G G A T G C W-3'	ImImPyHpImPy-γ-ImPyPyHpPyPy
1365)	5'-W G G A T C T W-3'	ImImPyHpPyHp-γ-PyImPyHpPyPy
1366)	5'-W G G A T C A W-3'	ImImPyHpPyPy-γ-HpImPyHpPyPy
1367)	5'-W G G A T C G W-3'	ImImPyHpPyIm-γ-PyImPyHpPyPy
1368)	5'-W G G A T C C W-3'	ImImPyHpPyPy-γ-ImImPyHpPyPy
1369)	5'-W G G A A T T W-3'	ImImPyPyHpHp-γ-PyPyHpHpPyPy
1370)	5'-W G G A A T A W-3'	ImImPyPyHpPy-γ-HpPyHpHpPyPy
1371)	5'-W G G A A T G W-3'	ImImPyPyHpIm-γ-PyPyHpHpPyPy
1372)	5'-W G G A A T C W-3'	ImImPyPyHpPy-γ-ImPyHpHpPyPy
1373)	5'-W G G A A A T W-3'	ImImPyPyPyHp-γ-PyHpHpHpPyPy
1374)	5'-W G G A A A A W-3'	ImImPyPyPyPy-γ-HpHpHpHpPyPy
1375)	5'-W G G A A A G W-3'	ImImPyPyPyIm-γ-PyHpHpHpPyPy
1376)	5'-W G G A A A C W-3'	ImImPyPyPyPy-γ-ImHpHpHpPyPy
1377)	5'-W G G A A G T W-3'	ImImPyPyImHp-γ-PyPyHpHpPyPy
1378)	5'-W G G A A G A W-3'	ImImPyPyImPy-γ-HpPyHpHpPyPy
1379)	5'-W G G A A G G W-3'	ImImPyPyImIm-γ-PyPyHpHpPyPy
1380)	5'-W G G A A G C W-3'	ImImPyPyImPy-γ-ImPyHpHpPyPy
1381)	5'-W G G A A C T W-3'	ImImPyPyPyHp-γ-PyImHpHpPyPy
1382)	5'-W G G A A C A W-3'	ImImPyPyPyPy-γ-HpImHpHpPyPy
1383)	5'-W G G A A C G W-3'	ImImPyPyPyIm-γ-PyImHpHpPyPy
1384)	5'-W G G A A C C W-3'	ImImPyPyPyPy-γ-ImImHpHpPyPy

TABLE 89: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGASNNW-3'

	DNA sequence	aromatic amino acid sequence
1385)	5'-W G G A G T T W-3'	ImImPyImHpHp-γ-PyPyPyHpPyPy
1386)	5'-W G G A G T A W-3'	ImImPyImHpPy-γ-HpPyPyHpPyPy
1387)	5'-W G G A G T G W-3'	ImImPyImHpIm-γ-PyPyPyHpPyPy
1388)	5'-W G G A G T C W-3'	ImImPyImHpPy-γ-ImPyPyHpPyPy
1389)	5'-W G G A G A T W-3'	ImImPyImPyHp-γ-PyHpPyHpPyPy
1390)	5'-W G G A G A A W-3'	ImImPyImPyPy-γ-HpHpPyHpPyPy
1391)	5'-W G G A G A G W-3'	ImImPyImPyIm-γ-PyHpPyHpPyPy
1392)	5'-W G G A G A C W-3'	ImImPyImPyPy-γ-ImHpPyHpPyPy
1393)	5'-W G G A G G T W-3'	ImImPyImImHp-γ-PyPyPyHpPyPy
1394)	5'-W G G A G G A W-3'	ImImPyImImPy-γ-HpPyPyHpPyPy
1395)	5'-W G G A G C T W-3'	ImImPyImPyHp-γ-PyImPyHpPyPy
1396)	5'-W G G A G C A W-3'	ImImPyImPyPy-γ-HpImPyHpPyPy
1397)	5'-W G G A G G G W-3'	ImImPyImImIm-γ-PyPyPyHpPyPy
1398)	5'-W G G A G G C W-3'	ImImPyImImPy-γ-ImPyPyHpPyPy
1399)	5'-W G G A G C G W-3'	ImImPyImPyIm-γ-PyImPyHpPyPy
1400)	5'-W G G A G C C W-3'	ImImPyImPyPy-γ-ImImPyHpPyPy
1401)	5'-W G G A C T T W-3'	ImImPyPyHpHp-γ-PyPyImHpPyPy
1402)	5'-W G G A C T A W-3'	ImImPyPyHpPy-γ-HpPyImHpPyPy
1403)	5'-W G G A C T G W-3'	ImImPyPyHpIm-γ-PyPyImHpPyPy
1404)	5'-W G G A C T C W-3'	ImImPyPyHpPy-γ-ImPyImHpPyPy
1405)	5'-W G G A C A T W-3'	ImImPyPyPyHp-γ-PyHpImHpPyPy
1406)	5'-W G G A C A A W-3'	ImImPyPyPyPy-γ-HpHpImHpPyPy
1407)	5'-W G G A C A G W-3'	ImImPyPyPyIm-γ-PyHpImHpPyPy
1408)	5'-W G G A C A C W-3'	ImImPyPyPyPy-γ-ImHpImHpPyPy
1409)	5'-W G G A C G T W-3'	ImImPyPyImHp-γ-PyPyImHpPyPy
1410)	5'-W G G A C G A W-3'	ImImPyPyImPy-γ-HpPyImHpPyPy
1411)	5'-W G G A C C T W-3'	ImImPyPyPyHp-γ-PyImImHpPyPy
1412)	5'-W G G A C C A W-3'	ImImPyPyPyPy-γ-HpImImHpPyPy
1413)	5'-W G G A C G G W-3'	ImImPyPyImIm-γ-PyPyImHpPyPy
1414)	5'-W G G A C G C W-3'	ImImPyPyImPy-γ-ImPyImHpPyPy
1415)	5'-W G G A C C G W-3'	ImImPyPyPyIm-γ-PyImImHpPyPy
1416)	5'-W G G A C C C W-3'	ImImPyPyPyPy-γ-ImImImHpPyPy

TABLE 90: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGCWNNW-3'

	DNA sequence	aromatic amino acid sequence
1417)	5'-W G G C T T T W-3'	ImImPyHpHpHp-γ-PyPyPyImPyPy
1418)	5'-W G G C T T A W-3'	ImImPyHpHpPy-γ-HpPyPyImPyPy
1419)	5'-W G G C T T G W-3'	ImImPyHpHpIm-γ-PyPyPyImPyPy
1420)	5'-W G G C T T C W-3'	ImImPyHpHpPy-γ-ImPyPyImPyPy
1421)	5'-W G G C T A T W-3'	ImImPyHpPyHp-γ-PyHpPyImPyPy
1422)	5'-W G G C T A A W-3'	ImImPyHpPyPy-γ-HpHpPyImPyPy
1423)	5'-W G G C T A G W-3'	ImImPyHpPyIm-γ-PyHpPyImPyPy
1424)	5'-W G G C T A C W-3'	ImImPyHpPyPy-γ-ImHpPyImPyPy
1425)	5'-W G G C T G T W-3'	ImImPyHpImHp-γ-PyPyPyImPyPy
1426)	5'-W G G C T G A W-3'	ImImPyHpImPy-γ-HpPyPyImPyPy
1427)	5'-W G G C T G G W-3'	ImImPyHpImIm-γ-PyPyPyImPyPy
1428)	5'-W G G C T G C W-3'	ImImPyHpImPy-γ-ImPyPyImPyPy
1429)	5'-W G G C T C T W-3'	ImImPyHpPyHp-γ-PyImPyImPyPy
1430)	5'-W G G C T C A W-3'	ImImPyHpPyPy-γ-HpImPyImPyPy
1431)	5'-W G G C T C G W-3'	ImImPyHpPyIm-γ-PyImPyImPyPy
1432)	5'-W G G C T C C W-3'	ImImPyHpPyPy-γ-ImImPyImPyPy
1433)	5'-W G G C A T T W-3'	ImImPyPyHpHp-γ-PyPyHpImPyPy
1434)	5'-W G G C A T A W-3'	ImImPyPyHpPy-γ-HpPyHpImPyPy
1435)	5'-W G G C A T G W-3'	ImImPyPyHpIm-γ-PyPyHpImPyPy
1436)	5'-W G G C A T C W-3'	ImImPyPyHpPy-γ-ImPyHpImPyPy
1437)	5'-W G G C A A T W-3'	ImImPyPyPyHp-γ-PyHpHpImPyPy
1438)	5'-W G G C A A A W-3'	ImImPyPyPyPy-γ-HpHpHpImPyPy
1439)	5'-W G G C A A G W-3'	ImImPyPyPyIm-γ-PyHpHpImPyPy
1440)	5'-W G G C A A C W-3'	ImImPyPyPyPy-γ-ImHpHpImPyPy
1441)	5'-W G G C A G T W-3'	ImImPyPyImHp-γ-PyPyHpImPyPy
1442)	5'-W G G C A G A W-3'	ImImPyPyImPy-γ-HpPyHpImPyPy
1443)	5'-W G G C A G G W-3'	ImImPyPyImIm-γ-PyPyHpImPyPy
1444)	5'-W G G C A G C W-3'	ImImPyPyImPy-γ-ImPyHpImPyPy
1445)	5'-W G G C A C T W-3'	ImImPyPyPyHp-γ-PyImHpImPyPy
1446)	5'-W G G C A C A W-3'	ImImPyPyPyPy-γ-HpImHpImPyPy
1447)	5'-W G G C A C G W-3'	ImImPyPyPyIm-γ-PyImHpImPyPy
1448)	5'-W G G C A C C W-3'	ImImPyPyPyPy-γ-ImImHpImPyPy

TABLE 91: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGCSNNW-3'

	DNA sequence	aromatic amino acid sequence
1449)	5'-W G G C G T T W-3'	ImImPyImHpHp-γ-PyPyPyImPyPy
1450)	5'-W G G C G T A W-3'	ImImPyImHpPy-γ-HpPyPyImPyPy
1451)	5'-W G G C G T G W-3'	ImImPyImHpIm-γ-PyPyPyImPyPy
1452)	5'-W G G C G T C W-3'	ImImPyImHpPy-γ-ImPyPyImPyPy
1453)	5'-W G G C G A T W-3'	ImImPyImPyHp-γ-PyHpPyImPyPy
1454)	5'-W G G C G A A W-3'	ImImPyImPyPy-γ-HpHpPyImPyPy
1455)	5'-W G G C G A G W-3'	ImImPyImPyIm-γ-PyHpPyImPyPy
1456)	5'-W G G C G A C W-3'	ImImPyImPyPy-γ-ImHpPyImPyPy
1457)	5'-W G G C G G T W-3'	ImImPyImImHp-γ-PyPyPyImPyPy
1458)	5'-W G G C G G A W-3'	ImImPyImImPy-γ-HpPyPyImPyPy
1459)	5'-W G G C G C T W-3'	ImImPyImPyHp-γ-PyImPyImPyPy
1460)	5'-W G G C G C A W-3'	ImImPyImPyPy-γ-HpImPyImPyPy
1461)	5'-W G G C C T T W-3'	ImImPyPyHpHp-γ-PyPyImImPyPy
1462)	5'-W G G C C T A W-3'	ImImPyPyHpPy-γ-HpPyImImPyPy
1463)	5'-W G G C C T G W-3'	ImImPyPyHpIm-γ-PyPyImImPyPy
1464)	5'-W G G C C T C W-3'	ImImPyPyHpPy-γ-ImPyImImPyPy
1465)	5'-W G G C C A T W-3'	ImImPyPyPyHp-γ-PyHpImImPyPy
1466)	5'-W G G C C A A W-3'	ImImPyPyPyPy-γ-HpHpImImPyPy
1467)	5'-W G G C C A G W-3'	ImImPyPyPyIm-γ-PyHpImImPyPy
1468)	5'-W G G C C A C W-3'	ImImPyPyPyPy-γ-ImHpImImPyPy
1469)	5'-W G G C C G T W-3'	ImImPyPyImHp-γ-PyPyImImPyPy
1470)	5'-W G G C C G A W-3'	ImImPyPyImPy-γ-HpPyImImPyPy
1471)	5'-W G G C C C T W-3'	ImImPyPyPyHp-γ-PyImImImPyPy
1472)	5'-W G G C C C A W-3'	ImImPyPyPyPy-γ-HpImImImPyPy
G57)	5'-W G G C G G G W-3'	ImImPyImImIm-γ-PyPyPyImPyPy
G58)	5'-W G G C G G C W-3'	ImImPyImImPy-γ-ImPyPyImPyPy
G59)	5'-W G G C G C G W-3'	ImImPyImPyIm-γ-PyImPyImPyPy
G60)	5'-W G G C G C C W-3'	ImImPyImPyPy-γ-ImImPyImPyPy
G61)	5'-W G G C C G G W-3'	ImImPyPyImIm-γ-PyPyImImPyPy
G62)	5'-W G G C C G C W-3'	ImImPyPyImPy-γ-ImPyImImPyPy
G63)	5'-W G G C C C G W-3'	ImImPyPyPyIm-γ-PyImImImPyPy
G64)	5'-W G G C C C C W-3'	ImImPyPyPyPy-γ-ImImImImPyPy

TABLE 92: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCGWNNW-3'

	DNA sequence	aromatic amino acid sequence
1473)	5'-W G C G T T T W-3'	ImPyImHpHpHp-γ-PyPyPyPyImPy
1474)	5'-W G C G T T A W-3'	ImPyImHpHpPy-γ-HpPyPyPyImPy
1475)	5'-W G C G T T G W-3'	ImPyImHpHpIm-γ-PyPyPyPyImPy
1476)	5'-W G C G T T C W-3'	ImPyImHpHpPy-γ-ImPyPyPyImPy
1477)	5'-W G C G T A T W-3'	ImPyImHpPyHp-γ-PyHpPyPyImPy
1478)	5'-W G C G T A A W-3'	ImPyImHpPyPy-γ-HpHpPyPyImPy
1479)	5'-W G C G T A G W-3'	ImPyImHpPyIm-γ-PyHpPyPyImPy
1480)	5'-W G C G T A C W-3'	ImPyImHpPyPy-γ-ImHpPyPyImPy
1481)	5'-W G C G T G T W-3'	ImPyImHpImHp-γ-PyPyPyPyImPy
1482)	5'-W G C G T G A W-3'	ImPyImHpImPy-γ-HpPyPyPyImPy
1483)	5'-W G C G T G G W-3'	ImPyImHpImIm-γ-PyPyPyPyImPy
1484)	5'-W G C G T G C W-3'	ImPyImHpImPy-γ-ImPyPyPyImPy
1485)	5'-W G C G T C T W-3'	ImPyImHpPyHp-γ-PyImPyPyImPy
1486)	5'-W G C G T C A W-3'	ImPyImHpPyPy-γ-HpImPyPyImPy
1487)	5'-W G C G T C G W-3'	ImPyImHpPyIm-γ-PyImPyPyImPy
1488)	5'-W G C G T C C W-3'	ImPyImHpPyPy-γ-ImImPyPyImPy
1489)	5'-W G C G A T T W-3'	ImPyImPyHpHp-γ-PyPyHpPyImPy
1490)	5'-W G C G A T A W-3'	ImPyImPyHpPy-γ-HpPyHpPyImPy
1491)	5'-W G C G A T G W-3'	ImPyImPyHpIm-γ-PyPyHpPyImPy
1492)	5'-W G C G A T C W-3'	ImPyImPyHpPy-γ-ImPyHpPyImPy
1493)	5'-W G C G A A T W-3'	ImPyImPyPyHp-γ-PyHpHpPyImPy
1494)	5'-W G C G A A A W-3'	ImPyImPyPyPy-γ-HpHpHpPyImPy
1495)	5'-W G C G A A G W-3'	ImPyImPyPyIm-γ-PyHpHpPyImPy
1496)	5'-W G C G A A C W-3'	ImPyImPyPyPy-γ-ImHpHpPyImPy
1497)	5'-W G C G A G T W-3'	ImPyImPyImHp-γ-PyPyHpPyImPy
1498)	5'-W G C G A G A W-3'	ImPyImPyImPy-γ-HpPyHpPyImPy
1499)	5'-W G C G A G G W-3'	ImPyImPyImIm-γ-PyPyHpPyImPy
1490)	5'-W G C G A G C W-3'	ImPyImPyImPy-γ-ImPyHpPyImPy
1501)	5'-W G C G A C T W-3'	ImPyImPyPyHp-γ-PyImHpPyImPy
1502)	5'-W G C G A C A W-3'	ImPyImPyPyPy-γ-HpImHpPyImPy
1503)	5'-W G C G A C G W-3'	ImPyImPyPyIm-γ-PyImHpPyImPy
1504)	5'-W G C G A C C W-3'	ImPyImPyPyPy-γ-ImImHpPyImPy

TABLE 93: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCGSNNW-3'

	DNA sequence	aromatic amino acid sequence
1505)	5'-W G C G G T T W-3'	ImPyImImHpHp-γ-PyPyPyPyImPy
1506)	5'-W G C G G T A W-3'	ImPyImImHpPy-γ-HpPyPyPyImPy
1507)	5'-W G C G G T G W-3'	ImPyImImHpIm-γ-PyPyPyPyImPy
1508)	5'-W G C G G T C W-3'	ImPyImImHpPy-γ-ImPyPyPyImPy
1509)	5'-W G C G G A T W-3'	ImPyImImPyHp-γ-PyHpPyPyImPy
1510)	5'-W G C G G A A W-3'	ImPyImImPyPy-γ-HpHpPyPyImPy
1511)	5'-W G C G G A G W-3'	ImPyImImPyIm-γ-PyHpPyPyImPy
1512)	5'-W G C G G A C W-3'	ImPyImImPyPy-γ-ImHpPyPyImPy
1513)	5'-W G C G G G T W-3'	ImPyImImImHp-γ-PyPyPyPyImPy
1514)	5'-W G C G G G A W-3'	ImPyImImImPy-γ-HpPyPyPyImPy
1515)	5'-W G C G G C T W-3'	ImPyImImPyHp-γ-PyImPyPyImPy
1516)	5'-W G C G G C A W-3'	ImPyImImPyPy-γ-HpImPyPyImPy
1517)	5'-W G C G C T T W-3'	ImPyImPyHpHp-γ-PyPyImPyImPy
1518)	5'-W G C G C T A W-3'	ImPyImPyHpPy-γ-HpPyImPyImPy
1519)	5'-W G C G C T G W-3'	ImPyImPyHpIm-γ-PyPyImPyImPy
1520)	5'-W G C G C T C W-3'	ImPyImPyHpPy-γ-ImPyImPyImPy
1521)	5'-W G C G C A T W-3'	ImPyImPyPyHp-γ-PyHpImPyImPy
1522)	5'-W G C G C A A W-3'	ImPyImPyPyPy-γ-HpHpImPyImPy
1523)	5'-W G C G C A G W-3'	ImPyImPyPyIm-γ-PyHpImPyImPy
1524)	5'-W G C G C A C W-3'	ImPyImPyPyPy-γ-ImHpImPyImPy
1525)	5'-W G C G C G T W-3'	ImPyImPyImHp-γ-PyPyImPyImPy
1526)	5'-W G C G C G A W-3'	ImPyImPyImPy-γ-HpPyImPyImPy
1527)	5'-W G C G C C T W-3'	ImPyImPyPyHp-γ-PyImImPyImPy
1528)	5'-W G C G C C A W-3'	ImPyImPyPyPy-γ-HpImImPyImPy
G65)	5'-W G C G G G G W-3'	ImPyImImImIm-γ-PyPyPyPyImPy
G66)	5'-W G C G G G C W-3'	ImPyImImImPy-γ-ImPyPyPyImPy
G67)	5'-W G C G G C G W-3'	ImPyImImPyIm-γ-PyImPyPyImPy
G68)	5'-W G C G G C C W-3'	ImPyImImPyPy-γ-ImImPyPyImPy
G69)	5'-W G C G C G G W-3'	ImPyImPyImIm-γ-PyPyImPyImPy
G70)	5'-W G C G C G C W-3'	ImPyImPyImPy-γ-ImPyImPyImPy
G71)	5'-W G C G C C G W-3'	ImPyImPyPyIm-γ-PyImImPyImPy
G72)	5'-W G C G C C C W-3'	ImPyImPyPyPy-γ-ImImImPyImPy

TABLE 94: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCTWNNW-3'

	DNA sequence	aromatic amino acid sequence
1529)	5'-W G C T T T T W-3'	ImPyHpHpHpHp-γ-PyPyPyPyImPy
1530)	5'-W G C T T T A W-3'	ImPyHpHpHpPy-γ-HpPyPyPyImPy
1531)	5'-W G C T T T G W-3'	ImPyHpHpHpIm-γ-PyPyPyPyImPy
1532)	5'-W G C T T T C W-3'	ImPyHpHpHpPy-γ-ImPyPyPyImPy
1533)	5'-W G C T T A T W-3'	ImPyHpHpPyHp-γ-PyHpPyPyImPy
1534)	5'-W G C T T A A W-3'	ImPyHpHpPyPy-γ-HpHpPyPyImPy
1535)	5'-W G C T T A G W-3'	ImPyHpHpPyIm-γ-PyHpPyPyImPy
1536)	5'-W G C T T A C W-3'	ImPyHpHpPyPy-γ-ImHpPyPyImPy
1537)	5'-W G C T T G T W-3'	ImPyHpHpImHp-γ-PyPyPyPyImPy
1538)	5'-W G C T T G A W-3'	ImPyHpHpImPy-γ-HpPyPyPyImPy
1539)	5'-W G C T T G G W-3'	ImPyHpHpImIm-γ-PyPyPyPyImPy
1540)	5'-W G C T T G C W-3'	ImPyHpHpImPy-γ-ImPyPyPyImPy
1541)	5'-W G C T T C T W-3'	ImPyHpHpPyHp-γ-PyImPyPyImPy
1542)	5'-W G C T T C A W-3'	ImPyHpHpPyPy-γ-HpImPyPyImPy
1543)	5'-W G C T T C G W-3'	ImPyHpHpPyIm-γ-PyImPyPyImPy
1544)	5'-W G C T T C C W-3'	ImPyHpHpPyPy-γ-ImImPyPyImPy
1545)	5'-W G C T A T T W-3'	ImPyHpPyHpHp-γ-PyPyHpPyImPy
1546)	5'-W G C T A T A W-3'	ImPyHpPyHpPy-γ-HpPyHpPyImPy
1547)	5'-W G C T A T G W-3'	ImPyHpPyHpIm-γ-PyPyHpPyImPy
1548)	5'-W G C T A T C W-3'	ImPyHpPyHpPy-γ-ImPyHpPyImPy
1549)	5'-W G C T A A T W-3'	ImPyHpPyPyHp-γ-PyHpHpPyImPy
1550)	5'-W G C T A A A W-3'	ImPyHpPyPyPy-γ-HpHpHpPyImPy
1551)	5'-W G C T A A G W-3'	ImPyHpPyPyIm-γ-PyHpHpPyImPy
1552)	5'-W G C T A A C W-3'	ImPyHpPyPyPy-γ-ImHpHpPyImPy
1553)	5'-W G C T A G T W-3'	ImPyHpPyImHp-γ-PyPyHpPyImPy
1554)	5'-W G C T A G A W-3'	ImPyHpPyImPy-γ-HpPyHpPyImPy
1555)	5'-W G C T A G G W-3'	ImPyHpPyImIm-γ-PyPyHpPyImPy
1556)	5'-W G C T A G C W-3'	ImPyHpPyImPy-γ-ImPyHpPyImPy
1557)	5'-W G C T A C T W-3'	ImPyHpPyPyHp-γ-PyImHpPyImPy
1558)	5'-W G C T A C A W-3'	ImPyHpPyPyPy-γ-HpImHpPyImPy
1559)	5'-W G C T A C G W-3'	ImPyHpPyPyIm-γ-PyImHpPyImPy
1560)	5'-W G C T A C C W-3'	ImPyHpPyPyPy-γ-ImImHpPyImPy

TABLE 95: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCTSNNW-3'

DNA sequence	aromatic amino acid sequence
1561) 5'-W G C T G T T W-3'	ImPyHpImHpHp-γ-PyPyPyPyImPy
1562) 5'-W G C T G T A W-3'	ImPyHpImHpPy-γ-HpPyPyPyImPy
1563) 5'-W G C T G T G W-3'	ImPyHpImHpIm-γ-PyPyPyPyImPy
1564) 5'-W G C T G T C W-3'	ImPyHpImHpPy-γ-ImPyPyPyImPy
1565) 5'-W G C T G A T W-3'	ImPyHpImPyHp-γ-PyHpPyPyImPy
1566) 5'-W G C T G A A W-3'	ImPyHpImPyPy-γ-HpHpPyPyImPy
1567) 5'-W G C T G A G W-3'	ImPyHpImPyIm-γ-PyHpPyPyImPy
1568) 5'-W G C T G A C W-3'	ImPyHpImPyPy-γ-ImHpPyPyImPy
1569) 5'-W G C T G G T W-3'	ImPyHpImImHp-γ-PyPyPyPyImPy
1570) 5'-W G C T G G A W-3'	ImPyHpImImPy-γ-HpPyPyPyImPy
1571) 5'-W G C T G C T W-3'	ImPyHpImPyHp-γ-PyImPyPyImPy
1572) 5'-W G C T G C A W-3'	ImPyHpImPyPy-γ-HpImPyPyImPy
1573) 5'-W G C T G G G W-3'	ImPyHpImImIm-γ-PyPyPyPyImPy
1574) 5'-W G C T G G C W-3'	ImPyHpImImPy-γ-ImPyPyPyImPy
1575) 5'-W G C T G C G W-3'	ImPyHpImPyIm-γ-PyImPyPyImPy
1576) 5'-W G C T G C C W-3'	ImPyHpImPyPy-γ-ImImPyPyImPy
1577) 5'-W G C T C T T W-3'	ImPyHpPyHpHp-γ-PyPyImPyImPy
1578) 5'-W G C T C T A W-3'	ImPyHpPyHpPy-γ-HpPyImPyImPy
1579) 5'-W G C T C T G W-3'	ImPyHpPyHpIm-γ-PyPyImPyImPy
1580) 5'-W G C T C T C W-3'	ImPyHpPyHpPy-γ-ImPyImPyImPy
1581) 5'-W G C T C A T W-3'	ImPyHpPyPyHp-γ-PyHpImPyImPy
1582) 5'-W G C T C A A W-3'	ImPyHpPyPyPy-γ-HpHpImPyImPy
1583) 5'-W G C T C A G W-3'	ImPyHpPyPyIm-γ-PyHpImPyImPy
1584) 5'-W G C T C A C W-3'	ImPyHpPyPyPy-γ-ImHpImPyImPy
1585) 5'-W G C T C G T W-3'	ImPyHpPyImHp-γ-PyPyImPyImPy
1586) 5'-W G C T C G A W-3'	ImPyHpPyImPy-γ-HpPyImPyImPy
1587) 5'-W G C T C C T W-3'	ImPyHpPyPyHp-γ-PyImImPyImPy
1588) 5'-W G C T C C A W-3'	ImPyHpPyPyPy-γ-HpImImPyImPy
1589) 5'-W G C T C G G W-3'	ImPyHpPyImIm-γ-PyPyImPyImPy
1590) 5'-W G C T C G C W-3'	ImPyHpPyImPy-γ-ImPyImPyImPy
1591) 5'-W G C T C C G W-3'	ImPyHpPyPyIm-γ-PyImImPyImPy
1592) 5'-W G C T C C C W-3'	ImPyHpPyPyPy-γ-ImImImPyImPy

TABLE 96: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCAWNNW-3'

	DNA sequence	aromatic amino acid sequence
1593)	5'-W G C A T T T W-3'	ImPyPyHpHpHp-γ-PyPyPyHpImPy
1594)	5'-W G C A T T A W-3'	ImPyPyHpHpPy-γ-HpPyPyHpImPy
1595)	5'-W G C A T T G W-3'	ImPyPyHpHpIm-γ-PyPyPyHpImPy
1596)	5'-W G C A T T C W-3'	ImPyPyHpHpPy-γ-ImPyPyHpImPy
1597)	5'-W G C A T A T W-3'	ImPyPyHpPyHp-γ-PyHpPyHpImPy
1598)	5'-W G C A T A A W-3'	ImPyPyHpPyPy-γ-HpHpPyHpImPy
1599)	5'-W G C A T A G W-3'	ImPyPyHpPyIm-γ-PyHpPyHpImPy
1600)	5'-W G C A T A C W-3'	ImPyPyHpPyPy-γ-ImHpPyHpImPy
1601)	5'-W G C A T G T W-3'	ImPyPyHpImHp-γ-PyPyPyHpImPy
1602)	5'-W G C A T G A W-3'	ImPyPyHpImPy-γ-HpPyPyHpImPy
1603)	5'-W G C A T G G W-3'	ImPyPyHpImIm-γ-PyPyPyHpImPy
1604)	5'-W G C A T G C W-3'	ImPyPyHpImPy-γ-ImPyPyHpImPy
1605)	5'-W G C A T C T W-3'	ImPyPyHpPyHp-γ-PyImPyHpImPy
1606)	5'-W G C A T C A W-3'	ImPyPyHpPyPy-γ-HpImPyHpImPy
1607)	5'-W G C A T C G W-3'	ImPyPyHpPyIm-γ-PyImPyHpImPy
1608)	5'-W G C A T C C W-3'	ImPyPyHpPyPy-γ-ImImPyHpImPy
1609)	5'-W G C A A T T W-3'	ImPyPyPyHpHp-γ-PyPyHpHpImPy
1610)	5'-W G C A A T A W-3'	ImPyPyPyHpPy-γ-HpPyHpHpImPy
1611)	5'-W G C A A T G W-3'	ImPyPyPyHpIm-γ-PyPyHpHpImPy
1612)	5'-W G C A A T C W-3'	ImPyPyPyHpPy-γ-ImPyHpHpImPy
1613)	5'-W G C A A A T W-3'	ImPyPyPyPyHp-γ-PyHpHpHpImPy
1614)	5'-W G C A A A A W-3'	ImPyPyPyPyPy-γ-HpHpHpHpImPy
1615)	5'-W G C A A A G W-3'	ImPyPyPyPyIm-γ-PyHpHpHpImPy
1616)	5'-W G C A A A C W-3'	ImPyPyPyPyPy-γ-ImHpHpHpImPy
1617)	5'-W G C A A G T W-3'	ImPyPyPyImHp-γ-PyPyHpHpImPy
1618)	5'-W G C A A G A W-3'	ImPyPyPyImPy-γ-HpPyHpHpImPy
1619)	5'-W G C A A G G W-3'	ImPyPyPyImIm-γ-PyPyHpHpImPy
1620)	5'-W G C A A G C W-3'	ImPyPyPyImPy-γ-ImPyHpHpImPy
1621)	5'-W G C A A C T W-3'	ImPyPyPyPyHp-γ-PyImHpHpImPy
1622)	5'-W G C A A C A W-3'	ImPyPyPyPyPy-γ-HpImHpHpImPy
1623)	5'-W G C A A C G W-3'	ImPyPyPyPyIm-γ-PyImHpHpImPy
1624)	5'-W G C A A C C W-3'	ImPyPyPyPyPy-γ-ImImHpHpImPy

TABLE 97: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCASNNW-3'

	DNA sequence	aromatic amino acid sequence
1625)	5'-W G C A G T T W-3'	ImPyPyPyImHpHp-γ-PyPyPyPyHpImPy
1626)	5'-W G C A G T A W-3'	ImPyPyPyImHpPy-γ-HpPyPyPyHpImPy
1627)	5'-W G C A G T G W-3'	ImPyPyPyImHpIm-γ-PyPyPyPyHpImPy
1628)	5'-W G C A G T C W-3'	ImPyPyPyImHpPy-γ-ImPyPyPyHpImPy
1629)	5'-W G C A G A T W-3'	ImPyPyPyImPyHp-γ-PyHpPyPyHpImPy
1630)	5'-W G C A G A A W-3'	ImPyPyPyImPyPy-γ-HpHpPyPyHpImPy
1631)	5'-W G C A G A G W-3'	ImPyPyPyImPyIm-γ-PyHpPyPyHpImPy
1632)	5'-W G C A G A C W-3'	ImPyPyPyImPyPy-γ-ImHpPyPyHpImPy
1633)	5'-W G C A G G T W-3'	ImPyPyPyImImHp-γ-PyPyPyPyHpImPy
1634)	5'-W G C A G G A W-3'	ImPyPyPyImImPy-γ-HpPyPyPyHpImPy
1635)	5'-W G C A G C T W-3'	ImPyPyPyImPyHp-γ-PyImPyPyHpImPy
1636)	5'-W G C A G C A W-3'	ImPyPyPyImPyPy-γ-HpImPyPyHpImPy
1637)	5'-W G C A G G G W-3'	ImPyPyPyImImIm-γ-PyPyPyPyHpImPy
1638)	5'-W G C A G G C W-3'	ImPyPyPyImImPy-γ-ImPyPyPyHpImPy
1639)	5'-W G C A G C G W-3'	ImPyPyPyImPyIm-γ-PyImPyPyHpImPy
1640)	5'-W G C A G C C W-3'	ImPyPyPyImPyPy-γ-ImImPyPyHpImPy
1641)	5'-W G C A C T T W-3'	ImPyPyPyPyHpHp-γ-PyPyPyImHpImPy
1642)	5'-W G C A C T A W-3'	ImPyPyPyPyHpPy-γ-HpPyPyImHpImPy
1643)	5'-W G C A C T G W-3'	ImPyPyPyPyHpIm-γ-PyPyPyImHpImPy
1644)	5'-W G C A C T C W-3'	ImPyPyPyPyHpPy-γ-ImPyPyImHpImPy
1645)	5'-W G C A C A T W-3'	ImPyPyPyPyPyHp-γ-PyHpPyImHpImPy
1646)	5'-W G C A C A A W-3'	ImPyPyPyPyPyPy-γ-HpHpPyImHpImPy
1647)	5'-W G C A C A G W-3'	ImPyPyPyPyPyIm-γ-PyHpPyImHpImPy
1648)	5'-W G C A C A C W-3'	ImPyPyPyPyPyPy-γ-ImHpPyImHpImPy
1649)	5'-W G C A C G T W-3'	ImPyPyPyPyImHp-γ-PyPyPyImHpImPy
1650)	5'-W G C A C G A W-3'	ImPyPyPyPyImPy-γ-HpPyPyImHpImPy
1651)	5'-W G C A C C T W-3'	ImPyPyPyPyPyHp-γ-PyPyImImHpImPy
1652)	5'-W G C A C C A W-3'	ImPyPyPyPyPyPy-γ-HpPyImImHpImPy
1653)	5'-W G C A C G G W-3'	ImPyPyPyPyImIm-γ-PyPyPyImHpImPy
1654)	5'-W G C A C G C W-3'	ImPyPyPyPyImPy-γ-ImPyPyImHpImPy
1655)	5'-W G C A C C G W-3'	ImPyPyPyPyPyIm-γ-PyPyImImHpImPy
1656)	5'-W G C A C C C W-3'	ImPyPyPyPyPyPy-γ-ImPyImImHpImPy

TABLE 98: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCCWNNW-3'

DNA sequence	aromatic amino acid sequence
1657) 5'-W G C C T T T W-3'	ImPyPyPyHpHpHp-γ-PyPyPyPyImImPy
1658) 5'-W G C C T T A W-3'	ImPyPyPyHpHpPy-γ-HpPyPyPyImImPy
1659) 5'-W G C C T T G W-3'	ImPyPyPyHpHpIm-γ-PyPyPyPyImImPy
1660) 5'-W G C C T T C W-3'	ImPyPyPyHpHpPy-γ-ImPyPyPyImImPy
1661) 5'-W G C C T A T W-3'	ImPyPyPyHpPyHp-γ-PyHpPyPyImImPy
1662) 5'-W G C C T A A W-3'	ImPyPyPyHpPyPy-γ-HpHpPyPyImImPy
1663) 5'-W G C C T A G W-3'	ImPyPyPyHpPyIm-γ-PyHpPyPyImImPy
1664) 5'-W G C C T A C W-3'	ImPyPyPyHpPyPy-γ-ImHpPyPyImImPy
1665) 5'-W G C C T G T W-3'	ImPyPyPyHpImHp-γ-PyPyPyPyImImPy
1666) 5'-W G C C T G A W-3'	ImPyPyPyHpImPy-γ-HpPyPyPyImImPy
1667) 5'-W G C C T G G W-3'	ImPyPyPyHpImIm-γ-PyPyPyPyImImPy
1668) 5'-W G C C T G C W-3'	ImPyPyPyHpImPy-γ-ImPyPyPyImImPy
1669) 5'-W G C C T C T W-3'	ImPyPyPyHpPyHp-γ-PyImPyPyImImPy
1670) 5'-W G C C T C A W-3'	ImPyPyPyHpPyPy-γ-HpImPyPyImImPy
1671) 5'-W G C C T C G W-3'	ImPyPyPyHpPyIm-γ-PyImPyPyImImPy
1672) 5'-W G C C T C C W-3'	ImPyPyPyHpPyPy-γ-ImImPyPyImImPy
1673) 5'-W G C C A T T W-3'	ImPyPyPyPyHpHp-γ-PyPyHpPyImImPy
1674) 5'-W G C C A T A W-3'	ImPyPyPyPyHpPy-γ-HpPyHpPyImImPy
1675) 5'-W G C C A T G W-3'	ImPyPyPyPyHpIm-γ-PyPyHpPyImImPy
1676) 5'-W G C C A T C W-3'	ImPyPyPyPyHpPy-γ-ImPyHpPyImImPy
1677) 5'-W G C C A A T W-3'	ImPyPyPyPyPyHp-γ-PyHpHpPyImImPy
1678) 5'-W G C C A A A W-3'	ImPyPyPyPyPyPy-γ-HpHpHpPyImImPy
1679) 5'-W G C C A A G W-3'	ImPyPyPyPyPyIm-γ-PyHpHpPyImImPy
1680) 5'-W G C C A A C W-3'	ImPyPyPyPyPyPy-γ-ImHpHpPyImImPy
1681) 5'-W G C C A G T W-3'	ImPyPyPyPyImHp-γ-PyPyHpPyImImPy
1682) 5'-W G C C A G A W-3'	ImPyPyPyPyImPy-γ-HpPyHpPyImImPy
1683) 5'-W G C C A G G W-3'	ImPyPyPyPyImIm-γ-PyPyHpPyImImPy
1684) 5'-W G C C A G C W-3'	ImPyPyPyPyImPy-γ-ImPyHpPyImImPy
1685) 5'-W G C C A C T W-3'	ImPyPyPyPyPyHp-γ-PyImHpPyImImPy
1686) 5'-W G C C A C A W-3'	ImPyPyPyPyPyPy-γ-HpImHpPyImImPy
1687) 5'-W G C C A C G W-3'	ImPyPyPyPyPyIm-γ-PyImHpPyImImPy
1688) 5'-W G C C A C C W-3'	ImPyPyPyPyPyPy-γ-ImImHpPyImImPy

TABLE 99: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCCSNNW-3'

	DNA sequence	aromatic amino acid sequence
1689)	5'-W G C C G T T W-3'	ImPyPyImHpHp-γ-PyPyPyImImPy
1690)	5'-W G C C G T A W-3'	ImPyPyImHpPy-γ-HpPyPyImImPy
1691)	5'-W G C C G T G W-3'	ImPyPyImHpIm-γ-PyPyPyImImPy
1692)	5'-W G C C G T C W-3'	ImPyPyImHpPy-γ-ImPyPyImImPy
1693)	5'-W G C C G A T W-3'	ImPyPyImPyHp-γ-PyHpPyImImPy
1694)	5'-W G C C G A A W-3'	ImPyPyImPyPy-γ-HpHpPyImImPy
1695)	5'-W G C C G A G W-3'	ImPyPyImPyIm-γ-PyHpPyImImPy
1696)	5'-W G C C G A C W-3'	ImPyPyImPyPy-γ-ImHpPyImImPy
1697)	5'-W G C C G G T W-3'	ImPyPyImImHp-γ-PyPyPyImImPy
1698)	5'-W G C C G G A W-3'	ImPyPyImImPy-γ-HpPyPyImImPy
1699)	5'-W G C C G C T W-3'	ImPyPyImPyHp-γ-PyImPyImImPy
1700)	5'-W G C C G C A W-3'	ImPyPyImPyPy-γ-HpImPyImImPy
1701)	5'-W G C C C T T W-3'	ImPyPyPyHpHp-γ-PyPyImImImPy
1702)	5'-W G C C C T A W-3'	ImPyPyPyHpPy-γ-HpPyImImImPy
1703)	5'-W G C C C T G W-3'	ImPyPyPyHpIm-γ-PyPyImImImPy
1704)	5'-W G C C C T C W-3'	ImPyPyPyHpPy-γ-ImPyImImImPy
1705)	5'-W G C C C A T W-3'	ImPyPyPyPyHp-γ-PyHpImImImPy
1706)	5'-W G C C C A A W-3'	ImPyPyPyPyPy-γ-HpHpImImImPy
1707)	5'-W G C C C A G W-3'	ImPyPyPyPyIm-γ-PyHpImImImPy
1708)	5'-W G C C C A C W-3'	ImPyPyPyPyPy-γ-ImHpImImImPy
1709)	5'-W G C C C G T W-3'	ImPyPyPyImHp-γ-PyPyImImImPy
1710)	5'-W G C C C G A W-3'	ImPyPyPyImPy-γ-HpPyImImImPy
1711)	5'-W G C C C C T W-3'	ImPyPyPyPyHp-γ-PyImImImImPy
1712)	5'-W G C C C C A W-3'	ImPyPyPyPyPy-γ-HpImImImImPy
G73)	5'-W G C C G G G W-3'	ImPyPyImImIm-γ-PyPyPyImImPy
G74)	5'-W G C C G G C W-3'	ImPyPyImImPy-γ-ImPyPyImImPy
G75)	5'-W G C C G C G W-3'	ImPyPyImPyIm-γ-PyImPyImImPy
G76)	5'-W G C C G C C W-3'	ImPyPyImPyPy-γ-ImImPyImImPy
G77)	5'-W G C C C G G W-3'	ImPyPyPyImIm-γ-PyPyImImImPy
G78)	5'-W G C C C G C W-3'	ImPyPyPyImPy-γ-ImPyImImImPy
G79)	5'-W G C C C C G W-3'	ImPyPyPyPyIm-γ-PyImImImImPy
G80)	5'-W G C C C C C W-3'	ImPyPyPyPyPy-γ-ImImImImImPy

TABLE 100: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGAGWNNW-3'

	DNA sequence	aromatic amino acid sequence
1713)	5'-W G A G T T T W-3'	ImPyImHpHpHp-γ-PyPyPyPyHpPy
1714)	5'-W G A G T T A W-3'	ImPyImHpHpPy-γ-HpPyPyPyHpPy
1715)	5'-W G A G T T G W-3'	ImPyImHpHpIm-γ-PyPyPyPyHpPy
1716)	5'-W G A G T T C W-3'	ImPyImHpHpPy-γ-ImPyPyPyHpPy
1717)	5'-W G A G T A T W-3'	ImPyImHpPyHp-γ-PyHpPyPyHpPy
1718)	5'-W G A G T A A W-3'	ImPyImHpPyPy-γ-HpHpPyPyHpPy
1719)	5'-W G A G T A G W-3'	ImPyImHpPyIm-γ-PyHpPyPyHpPy
1720)	5'-W G A G T A C W-3'	ImPyImHpPyPy-γ-ImHpPyPyHpPy
1721)	5'-W G A G T G T W-3'	ImPyImHpImHp-γ-PyPyPyPyHpPy
1722)	5'-W G A G T G A W-3'	ImPyImHpImPy-γ-HpPyPyPyHpPy
1723)	5'-W G A G T G G W-3'	ImPyImHpImIm-γ-PyPyPyPyHpPy
1724)	5'-W G A G T G C W-3'	ImPyImHpImPy-γ-ImPyPyPyHpPy
1725)	5'-W G A G T C T W-3'	ImPyImHpPyHp-γ-PyImPyPyHpPy
1726)	5'-W G A G T C A W-3'	ImPyImHpPyPy-γ-HpImPyPyHpPy
1727)	5'-W G A G T C G W-3'	ImPyImHpPyIm-γ-PyImPyPyHpPy
1728)	5'-W G A G T C C W-3'	ImPyImHpPyPy-γ-ImImPyPyHpPy
1729)	5'-W G A G A T T W-3'	ImPyImPyHpHp-γ-PyPyHpPyHpPy
1730)	5'-W G A G A T A W-3'	ImPyImPyHpPy-γ-HpPyHpPyHpPy
1731)	5'-W G A G A T G W-3'	ImPyImPyHpIm-γ-PyPyHpPyHpPy
1732)	5'-W G A G A T C W-3'	ImPyImPyHpPy-γ-ImPyHpPyHpPy
1733)	5'-W G A G A A T W-3'	ImPyImPyPyHp-γ-PyHpHpPyHpPy
1734)	5'-W G A G A A A W-3'	ImPyImPyPyPy-γ-HpHpHpPyHpPy
1735)	5'-W G A G A A G W-3'	ImPyImPyPyIm-γ-PyHpHpPyHpPy
1736)	5'-W G A G A A C W-3'	ImPyImPyPyPy-γ-ImHpHpPyHpPy
1737)	5'-W G A G A G T W-3'	ImPyImPyImHp-γ-PyPyHpPyHpPy
1738)	5'-W G A G A G A W-3'	ImPyImPyImPy-γ-HpPyHpPyHpPy
1739)	5'-W G A G A G G W-3'	ImPyImPyImIm-γ-PyPyHpPyHpPy
1740)	5'-W G A G A G C W-3'	ImPyImPyImPy-γ-ImPyHpPyHpPy
1741)	5'-W G A G A C T W-3'	ImPyImPyPyHp-γ-PyImHpPyHpPy
1742)	5'-W G A G A C A W-3'	ImPyImPyPyPy-γ-HpImHpPyHpPy
1743)	5'-W G A G A C G W-3'	ImPyImPyPyIm-γ-PyImHpPyHpPy
1744)	5'-W G A G A C C W-3'	ImPyImPyPyPy-γ-ImImHpPyHpPy

TABLE 101: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGAGSNNW-3'

	DNA sequence	aromatic amino acid sequence
1745)	5'-W G A G G T T W-3'	ImPyImImHpHp-γ-PyPyPyPyHpPy
1746)	5'-W G A G G T A W-3'	ImPyImImHpPy-γ-HpPyPyPyHpPy
1747)	5'-W G A G G T G W-3'	ImPyImImHpIm-γ-PyPyPyPyHpPy
1748)	5'-W G A G G T C W-3'	ImPyImImHpPy-γ-ImPyPyPyHpPy
1749)	5'-W G A G G A T W-3'	ImPyImImPyHp-γ-PyHpPyPyHpPy
1750)	5'-W G A G G A A W-3'	ImPyImImPyPy-γ-HpHpPyPyHpPy
1751)	5'-W G A G G A G W-3'	ImPyImImPyIm-γ-PyHpPyPyHpPy
1752)	5'-W G A G G A C W-3'	ImPyImImPyPy-γ-ImHpPyPyHpPy
1753)	5'-W G A G G G T W-3'	ImPyImImImHp-γ-PyPyPyPyHpPy
1754)	5'-W G A G G G A W-3'	ImPyImImImPy-γ-HpPyPyPyHpPy
1755)	5'-W G A G G C T W-3'	ImPyImImPyHp-γ-PyImPyPyHpPy
1756)	5'-W G A G G C A W-3'	ImPyImImPyPy-γ-HpImPyPyHpPy
1757)	5'-W G A G C T T W-3'	ImPyImPyHpHp-γ-PyPyImPyHpPy
1758)	5'-W G A G C T A W-3'	ImPyImPyHpPy-γ-HpPyImPyHpPy
1759)	5'-W G A G C T G W-3'	ImPyImPyHpIm-γ-PyPyImPyHpPy
1760)	5'-W G A G C T C W-3'	ImPyImPyHpPy-γ-ImPyImPyHpPy
1761)	5'-W G A G C A T W-3'	ImPyImPyPyHp-γ-PyHpImPyHpPy
1762)	5'-W G A G C A A W-3'	ImPyImPyPyPy-γ-HpHpImPyHpPy
1763)	5'-W G A G C A G W-3'	ImPyImPyPyIm-γ-PyHpImPyHpPy
1764)	5'-W G A G C A C W-3'	ImPyImPyPyPy-γ-ImHpImPyHpPy
1765)	5'-W G A G C G T W-3'	ImPyImPyImHp-γ-PyPyImPyHpPy
1766)	5'-W G A G C G A W-3'	ImPyImPyImPy-γ-HpPyImPyHpPy
1767)	5'-W G A G C C T W-3'	ImPyImPyPyHp-γ-PyImImPyHpPy
1768)	5'-W G A G C C A W-3'	ImPyImPyPyPy-γ-HpImImPyHpPy
1769)	5'-W G A G G G G W-3'	ImPyImImImIm-γ-PyPyPyPyHpPy
1770)	5'-W G A G G G C W-3'	ImPyImImImPy-γ-ImPyPyPyHpPy
1771)	5'-W G A G G C G W-3'	ImPyImImPyIm-γ-PyImPyPyHpPy
1772)	5'-W G A G G C C W-3'	ImPyImImPyPy-γ-ImImPyPyHpPy
1773)	5'-W G A G C G G W-3'	ImPyImPyImIm-γ-PyPyImPyHpPy
1774)	5'-W G A G C G C W-3'	ImPyImPyImPy-γ-ImPyImPyHpPy
1775)	5'-W G A G C C G W-3'	ImPyImPyPyIm-γ-PyImImPyHpPy
1776)	5'-W G A G C C C W-3'	ImPyImPyPyPy-γ-ImImImPyHpPy

TABLE 102: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGATWNNW-3'

	DNA sequence	aromatic amino acid sequence
1777)	5'-W G A T T T T W-3'	ImPyHpHpHpHp-γ-PyPyPyPyHpPy
1778)	5'-W G A T T T A W-3'	ImPyHpHpHpPy-γ-HpPyPyPyHpPy
1779)	5'-W G A T T T G W-3'	ImPyHpHpHpIm-γ-PyPyPyPyHpPy
1780)	5'-W G A T T T C W-3'	ImPyHpHpHpPy-γ-ImPyPyPyHpPy
1781)	5'-W G A T T A T W-3'	ImPyHpHpPyHp-γ-PyHpPyPyHpPy
1782)	5'-W G A T T A A W-3'	ImPyHpHpPyPy-γ-HpHpPyPyHpPy
1783)	5'-W G A T T A G W-3'	ImPyHpHpPyIm-γ-PyHpPyPyHpPy
1784)	5'-W G A T T A C W-3'	ImPyHpHpPyPy-γ-ImHpPyPyHpPy
1785)	5'-W G A T T G T W-3'	ImPyHpHpImHp-γ-PyPyPyPyHpPy
1786)	5'-W G A T T G A W-3'	ImPyHpHpImPy-γ-HpPyPyPyHpPy
1787)	5'-W G A T T G G W-3'	ImPyHpHpImIm-γ-PyPyPyPyHpPy
1788)	5'-W G A T T G C W-3'	ImPyHpHpImPy-γ-ImPyPyPyHpPy
1789)	5'-W G A T T C T W-3'	ImPyHpHpPyHp-γ-PyImPyPyHpPy
1790)	5'-W G A T T C A W-3'	ImPyHpHpPyPy-γ-HpImPyPyHpPy
1791)	5'-W G A T T C G W-3'	ImPyHpHpPyIm-γ-PyImPyPyHpPy
1792)	5'-W G A T T C C W-3'	ImPyHpHpPyPy-γ-ImImPyPyHpPy
1793)	5'-W G A T A T T W-3'	ImPyHpPyHpHp-γ-PyPyHpPyHpPy
1794)	5'-W G A T A T A W-3'	ImPyHpPyHpPy-γ-HpPyHpPyHpPy
1795)	5'-W G A T A T G W-3'	ImPyHpPyHpIm-γ-PyPyHpPyHpPy
1796)	5'-W G A T A T C W-3'	ImPyHpPyHpPy-γ-ImPyHpPyHpPy
1797)	5'-W G A T A A T W-3'	ImPyHpPyPyHp-γ-PyHpHpPyHpPy
1798)	5'-W G A T A A A W-3'	ImPyHpPyPyPy-γ-HpHpHpPyHpPy
1799)	5'-W G A T A A G W-3'	ImPyHpPyPyIm-γ-PyHpHpPyHpPy
1800)	5'-W G A T A A C W-3'	ImPyHpPyPyPy-γ-ImHpHpPyHpPy
1801)	5'-W G A T A G T W-3'	ImPyHpPyImHp-γ-PyPyHpPyHpPy
1802)	5'-W G A T A G A W-3'	ImPyHpPyImPy-γ-HpPyHpPyHpPy
1803)	5'-W G A T A G G W-3'	ImPyHpPyImIm-γ-PyPyHpPyHpPy
1804)	5'-W G A T A G C W-3'	ImPyHpPyImPy-γ-ImPyHpPyHpPy
1805)	5'-W G A T A C T W-3'	ImPyHpPyPyHp-γ-PyImHpPyHpPy
1806)	5'-W G A T A C A W-3'	ImPyHpPyPyPy-γ-HpImHpPyHpPy
1807)	5'-W G A T A C G W-3'	ImPyHpPyPyIm-γ-PyImHpPyHpPy
1808)	5'-W G A T A C C W-3'	ImPyHpPyPyPy-γ-ImImHpPyHpPy

TABLE 103: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGATSNNW-3'

	DNA sequence	aromatic amino acid sequence
1809)	5'-W G A T G T T W-3'	ImPyHpImHpHp-γ-PyPyPyPyHpPy
1810)	5'-W G A T G T A W-3'	ImPyHpImHpPy-γ-HpPyPyPyHpPy
1811)	5'-W G A T G T G W-3'	ImPyHpImHpIm-γ-PyPyPyPyHpPy
1812)	5'-W G A T G T C W-3'	ImPyHpImHpPy-γ-ImPyPyPyHpPy
1813)	5'-W G A T G A T W-3'	ImPyHpImPyHp-γ-PyHpPyPyHpPy
1814)	5'-W G A T G A A W-3'	ImPyHpImPyPy-γ-HpHpPyPyHpPy
1815)	5'-W G A T G A G W-3'	ImPyHpImPyIm-γ-PyHpPyPyHpPy
1816)	5'-W G A T G A C W-3'	ImPyHpImPyPy-γ-ImHpPyPyHpPy
1817)	5'-W G A T G G T W-3'	ImPyHpImImHp-γ-PyPyPyPyHpPy
1818)	5'-W G A T G G A W-3'	ImPyHpImImPy-γ-HpPyPyPyHpPy
1819)	5'-W G A T G C T W-3'	ImPyHpImPyHp-γ-PyImPyPyHpPy
1820)	5'-W G A T G C A W-3'	ImPyHpImPyPy-γ-HpImPyPyHpPy
1821)	5'-W G A T G G G W-3'	ImPyHpImImIm-γ-PyPyPyPyHpPy
1822)	5'-W G A T G G C W-3'	ImPyHpImImPy-γ-ImPyPyPyHpPy
1823)	5'-W G A T G C G W-3'	ImPyHpImPyIm-γ-PyImPyPyHpPy
1824)	5'-W G A T G C C W-3'	ImPyHpImPyPy-γ-ImImPyPyHpPy
1825)	5'-W G A T C T T W-3'	ImPyHpPyHpHp-γ-PyPyImPyHpPy
1826)	5'-W G A T C T A W-3'	ImPyHpPyHpPy-γ-HpPyImPyHpPy
1827)	5'-W G A T C T G W-3'	ImPyHpPyHpIm-γ-PyPyImPyHpPy
1828)	5'-W G A T C T C W-3'	ImPyHpPyHpPy-γ-ImPyImPyHpPy
1829)	5'-W G A T C A T W-3'	ImPyHpPyPyHp-γ-PyHpImPyHpPy
1830)	5'-W G A T C A A W-3'	ImPyHpPyPyPy-γ-HpHpImPyHpPy
1831)	5'-W G A T C A G W-3'	ImPyHpPyPyIm-γ-PyHpImPyHpPy
1832)	5'-W G A T C A C W-3'	ImPyHpPyPyPy-γ-ImHpImPyHpPy
1833)	5'-W G A T C G T W-3'	ImPyHpPyImHp-γ-PyPyImPyHpPy
1834)	5'-W G A T C G A W-3'	ImPyHpPyImPy-γ-HpPyImPyHpPy
1835)	5'-W G A T C C T W-3'	ImPyHpPyPyHp-γ-PyImImPyHpPy
1836)	5'-W G A T C C A W-3'	ImPyHpPyPyPy-γ-HpImImPyHpPy
1837)	5'-W G A T C G G W-3'	ImPyHpPyImIm-γ-PyPyImPyHpPy
1838)	5'-W G A T C G C W-3'	ImPyHpPyImPy-γ-ImPyImPyHpPy
1839)	5'-W G A T C C G W-3'	ImPyHpPyPyIm-γ-PyImImPyHpPy
1840)	5'-W G A T C C C W-3'	ImPyHpPyPyPy-γ-ImImImPyHpPy

TABLE 104: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGAAWNNW-3'

	DNA sequence	aromatic amino acid sequence
1841)	5'-W G A A T T T W-3'	ImPyPyHpHpHp-γ-PyPyPyHpHpPy
1842)	5'-W G A A T T A W-3'	ImPyPyHpHpPy-γ-HpPyPyHpHpPy
1843)	5'-W G A A T T G W-3'	ImPyPyHpHpIm-γ-PyPyPyHpHpPy
1844)	5'-W G A A T T C W-3'	ImPyPyHpHpPy-γ-ImPyPyHpHpPy
1845)	5'-W G A A T A T W-3'	ImPyPyHpPyHp-γ-PyHpPyHpHpPy
1846)	5'-W G A A T A A W-3'	ImPyPyHpPyPy-γ-HpHpPyHpHpPy
1847)	5'-W G A A T A G W-3'	ImPyPyHpPyIm-γ-PyHpPyHpHpPy
1848)	5'-W G A A T A C W-3'	ImPyPyHpPyPy-γ-ImHpPyHpHpPy
1849)	5'-W G A A T G T W-3'	ImPyPyHpImHp-γ-PyPyPyHpHpPy
1850)	5'-W G A A T G A W-3'	ImPyPyHpImPy-γ-HpPyPyHpHpPy
1851)	5'-W G A A T G G W-3'	ImPyPyHpImIm-γ-PyPyPyHpHpPy
1852)	5'-W G A A T G C W-3'	ImPyPyHpImPy-γ-ImPyPyHpHpPy
1853)	5'-W G A A T C T W-3'	ImPyPyHpPyHp-γ-PyImPyHpHpPy
1854)	5'-W G A A T C A W-3'	ImPyPyHpPyPy-γ-HpImPyHpHpPy
1855)	5'-W G A A T C G W-3'	ImPyPyHpPyIm-γ-PyImPyHpHpPy
1856)	5'-W G A A T C C W-3'	ImPyPyHpPyPy-γ-ImImPyHpHpPy
1857)	5'-W G A A A T T W-3'	ImPyPyPyHpHp-γ-PyPyHpHpHpPy
1858)	5'-W G A A A T A W-3'	ImPyPyPyHpPy-γ-HpPyHpHpHpPy
1869)	5'-W G A A A T G W-3'	ImPyPyPyHpIm-γ-PyPyHpHpHpPy
1860)	5'-W G A A A T C W-3'	ImPyPyPyHpPy-γ-ImPyHpHpHpPy
1861)	5'-W G A A A A T W-3'	ImPyPyPyPyHp-γ-PyHpHpHpHpPy
1862)	5'-W G A A A A A W-3'	ImPyPyPyPyPy-γ-HpHpHpHpHpPy
1863)	5'-W G A A A A G W-3'	ImPyPyPyPyIm-γ-PyHpHpHpHpPy
1864)	5'-W G A A A A C W-3'	ImPyPyPyPyPy-γ-ImHpHpHpHpPy
1865)	5'-W G A A A G T W-3'	ImPyPyPyImHp-γ-PyPyHpHpHpPy
1866)	5'-W G A A A G A W-3'	ImPyPyPyImPy-γ-HpPyHpHpHpPy
1867)	5'-W G A A A G G W-3'	ImPyPyPyImIm-γ-PyPyHpHpHpPy
1868)	5'-W G A A A G C W-3'	ImPyPyPyImPy-γ-ImPyHpHpHpPy
1869)	5'-W G A A A C T W-3'	ImPyPyPyPyHp-γ-PyImHpHpHpPy
1870)	5'-W G A A A C A W-3'	ImPyPyPyPyPy-γ-HpImHpHpHpPy
1871)	5'-W G A A A C G W-3'	ImPyPyPyPyIm-γ-PyImHpHpHpPy
1872)	5'-W G A A A C C W-3'	ImPyPyPyPyPy-γ-ImImHpHpHpPy

TABLE 105: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGAASNNW-3'

DNA sequence	aromatic amino acid sequence
1873) 5'-W G A A G T T W-3'	ImPyPyImHpHp-γ-PyPyPyHpHpPy
1874) 5'-W G A A G T A W-3'	ImPyPyImHpPy-γ-HpPyPyHpHpPy
1875) 5'-W G A A G T G W-3'	ImPyPyImHpIm-γ-PyPyPyHpHpPy
1876) 5'-W G A A G T C W-3'	ImPyPyImHpPy-γ-ImPyPyHpHpPy
1877) 5'-W G A A G A T W-3'	ImPyPyImPyHp-γ-PyHpPyHpHpPy
1878) 5'-W G A A G A A W-3'	ImPyPyImPyPy-γ-HpHpPyHpHpPy
1879) 5'-W G A A G A G W-3'	ImPyPyImPyIm-γ-PyHpPyHpHpPy
1880) 5'-W G A A G A C W-3'	ImPyPyImPyPy-γ-ImHpPyHpHpPy
1881) 5'-W G A A G G T W-3'	ImPyPyImImHp-γ-PyPyPyHpHpPy
1882) 5'-W G A A G G A W-3'	ImPyPyImImPy-γ-HpPyPyHpHpPy
1883) 5'-W G A A G C T W-3'	ImPyPyImPyHp-γ-PyImPyHpHpPy
1884) 5'-W G A A G C A W-3'	ImPyPyImPyPy-γ-HpImPyHpHpPy
1885) 5'-W G A A G G G W-3'	ImPyPyImImIm-γ-PyPyPyHpHpPy
1886) 5'-W G A A G G C W-3'	ImPyPyImImPy-γ-ImPyPyHpHpPy
1887) 5'-W G A A G C G W-3'	ImPyPyImPyIm-γ-PyImPyHpHpPy
1888) 5'-W G A A G C C W-3'	ImPyPyImPyPy-γ-ImImPyHpHpPy
1889) 5'-W G A A C T T W-3'	ImPyPyPyHpHp-γ-PyPyImHpHpPy
1890) 5'-W G A A C T A W-3'	ImPyPyPyHpPy-γ-HpPyImHpHpPy
1891) 5'-W G A A C T G W-3'	ImPyPyPyHpIm-γ-PyPyImHpHpPy
1892) 5'-W G A A C T C W-3'	ImPyPyPyHpPy-γ-ImPyImHpHpPy
1893) 5'-W G A A C A T W-3'	ImPyPyPyPyHp-γ-PyHpImHpHpPy
1894) 5'-W G A A C A A W-3'	ImPyPyPyPyPy-γ-HpHpImHpHpPy
1895) 5'-W G A A C A G W-3'	ImPyPyPyPyIm-γ-PyHpImHpHpPy
1896) 5'-W G A A C A C W-3'	ImPyPyPyPyPy-γ-ImHpImHpHpPy
1897) 5'-W G A A C G T W-3'	ImPyPyPyImHp-γ-PyPyImHpHpPy
1898) 5'-W G A A C G A W-3'	ImPyPyPyImPy-γ-HpPyImHpHpPy
1899) 5'-W G A A C C T W-3'	ImPyPyPyPyHp-γ-PyImImHpHpPy
1900) 5'-W G A A C C A W-3'	ImPyPyPyPyPy-γ-HpImImHpHpPy
1901) 5'-W G A A C G G W-3'	ImPyPyPyImIm-γ-PyPyImHpHpPy
1902) 5'-W G A A C G C W-3'	ImPyPyPyImPy-γ-ImPyImHpHpPy
1903) 5'-W G A A C C G W-3'	ImPyPyPyPyIm-γ-PyImImHpHpPy
1904) 5'-W G A A C C C W-3'	ImPyPyPyPyPy-γ-ImImImHpHpPy

TABLE 106: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGACWNNW-3'

	DNA sequence	aromatic amino acid sequence
1905)	5'-W G A C T T T W-3'	ImPyPyHpHpHp-γ-PyPyPyImHpPy
1906)	5'-W G A C T T A W-3'	ImPyPyHpHpPy-γ-HpPyPyImHpPy
1907)	5'-W G A C T T G W-3'	ImPyPyHpHpIm-γ-PyPyPyImHpPy
1908)	5'-W G A C T T C W-3'	ImPyPyHpHpPy-γ-ImPyPyImHpPy
1909)	5'-W G A C T A T W-3'	ImPyPyHpPyHp-γ-PyHpPyImHpPy
1910)	5'-W G A C T A A W-3'	ImPyPyHpPyPy-γ-HpHpPyImHpPy
1911)	5'-W G A C T A G W-3'	ImPyPyHpPyIm-γ-PyHpPyImHpPy
1912)	5'-W G A C T A C W-3'	ImPyPyHpPyPy-γ-ImHpPyImHpPy
1913)	5'-W G A C T G T W-3'	ImPyPyHpImHp-γ-PyPyPyImHpPy
1914)	5'-W G A C T G A W-3'	ImPyPyHpImPy-γ-HpPyPyImHpPy
1915)	5'-W G A C T G G W-3'	ImPyPyHpImIm-γ-PyPyPyImHpPy
1916)	5'-W G A C T G C W-3'	ImPyPyHpImPy-γ-ImPyPyImHpPy
1917)	5'-W G A C T C T W-3'	ImPyPyHpPyHp-γ-PyImPyImHpPy
1918)	5'-W G A C T C A W-3'	ImPyPyHpPyPy-γ-HpImPyImHpPy
1919)	5'-W G A C T C G W-3'	ImPyPyHpPyIm-γ-PyImPyImHpPy
1920)	5'-W G A C T C C W-3'	ImPyPyHpPyPy-γ-ImImPyImHpPy
1921)	5'-W G A C A T T W-3'	ImPyPyPyHpHp-γ-PyPyHpImHpPy
1922)	5'-W G A C A T A W-3'	ImPyPyPyHpPy-γ-HpPyHpImHpPy
1923)	5'-W G A C A T G W-3'	ImPyPyPyHpIm-γ-PyPyHpImHpPy
1924)	5'-W G A C A T C W-3'	ImPyPyPyHpPy-γ-ImPyHpImHpPy
1925)	5'-W G A C A A T W-3'	ImPyPyPyPyHp-γ-PyHpHpImHpPy
1926)	5'-W G A C A A A W-3'	ImPyPyPyPyPy-γ-HpHpHpImHpPy
1927)	5'-W G A C A A G W-3'	ImPyPyPyPyIm-γ-PyHpHpImHpPy
1928)	5'-W G A C A A C W-3'	ImPyPyPyPyPy-γ-ImHpHpImHpPy
1929)	5'-W G A C A G T W-3'	ImPyPyPyImHp-γ-PyPyHpImHpPy
1930)	5'-W G A C A G A W-3'	ImPyPyPyImPy-γ-HpPyHpImHpPy
1931)	5'-W G A C A G G W-3'	ImPyPyPyImIm-γ-PyPyHpImHpPy
1932)	5'-W G A C A G C W-3'	ImPyPyPyImPy-γ-ImPyHpImHpPy
1933)	5'-W G A C A C T W-3'	ImPyPyPyPyHp-γ-PyImHpImHpPy
1934)	5'-W G A C A C A W-3'	ImPyPyPyPyPy-γ-HpImHpImHpPy
1935)	5'-W G A C A C G W-3'	ImPyPyPyPyIm-γ-PyImHpImHpPy
1936)	5'-W G A C A C C W-3'	ImPyPyPyPyPy-γ-ImImHpImHpPy

TABLE 107: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGACSNNW-3'

	DNA sequence	aromatic amino acid sequence
1937)	5'-W G A C G T T W-3'	ImPyPyImHpHp-γ-PyPyPyImHpPy
1938)	5'-W G A C G T A W-3'	ImPyPyImHpPy-γ-HpPyPyImHpPy
1939)	5'-W G A C G T G W-3'	ImPyPyImHpIm-γ-PyPyPyImHpPy
1940)	5'-W G A C G T C W-3'	ImPyPyImHpPy-γ-ImPyPyImHpPy
1941)	5'-W G A C G A T W-3'	ImPyPyImPyHp-γ-PyHpPyImHpPy
1942)	5'-W G A C G A A W-3'	ImPyPyImPyPy-γ-HpHpPyImHpPy
1943)	5'-W G A C G A G W-3'	ImPyPyImPyIm-γ-PyHpPyImHpPy
1944)	5'-W G A C G A C W-3'	ImPyPyImPyPy-γ-ImHpPyImHpPy
1945)	5'-W G A C G G T W-3'	ImPyPyImImHp-γ-PyPyPyImHpPy
1946)	5'-W G A C G G A W-3'	ImPyPyImImPy-γ-HpPyPyImHpPy
1947)	5'-W G A C G C T W-3'	ImPyPyImPyHp-γ-PyImPyImHpPy
1948)	5'-W G A C G C A W-3'	ImPyPyImPyPy-γ-HpImPyImHpPy
1949)	5'-W G A C C T T W-3'	ImPyPyPyHpHp-γ-PyPyImImHpPy
1950)	5'-W G A C C T A W-3'	ImPyPyPyHpPy-γ-HpPyImImHpPy
1951)	5'-W G A C C T G W-3'	ImPyPyPyHpIm-γ-PyPyImImHpPy
1952)	5'-W G A C C T C W-3'	ImPyPyPyHpPy-γ-ImPyImImHpPy
1953)	5'-W G A C C A T W-3'	ImPyPyPyPyHp-γ-PyHpImImHpPy
1954)	5'-W G A C C A A W-3'	ImPyPyPyPyPy-γ-HpHpImImHpPy
1955)	5'-W G A C C A G W-3'	ImPyPyPyPyIm-γ-PyHpImImHpPy
1956)	5'-W G A C C A C W-3'	ImPyPyPyPyPy-γ-ImHpImImHpPy
1957)	5'-W G A C C G T W-3'	ImPyPyPyImHp-γ-PyPyImImHpPy
1958)	5'-W G A C C G A W-3'	ImPyPyPyImPy-γ-HpPyImImHpPy
1959)	5'-W G A C C C T W-3'	ImPyPyPyPyHp-γ-PyImImImHpPy
1960)	5'-W G A C C C A W-3'	ImPyPyPyPyPy-γ-HpImImImHpPy
1961)	5'-W G A C G G G W-3'	ImPyPyImImIm-γ-PyPyPyImHpPy
1962)	5'-W G A C G G C W-3'	ImPyPyImImPy-γ-ImPyPyImHpPy
1963)	5'-W G A C G C G W-3'	ImPyPyImPyIm-γ-PyImPyImHpPy
1964)	5'-W G A C G C C W-3'	ImPyPyImPyPy-γ-ImImPyImHpPy
1965)	5'-W G A C C G G W-3'	ImPyPyPyImIm-γ-PyPyImImHpPy
1966)	5'-W G A C C G C W-3'	ImPyPyPyImPy-γ-ImPyImImHpPy
1967)	5'-W G A C C C G W-3'	ImPyPyPyPyIm-γ-PyImImImHpPy
1968)	5'-W G A C C C C W-3'	ImPyPyPyPyPy-γ-ImImImImHpPy

TABLE 108: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTGWNNW-3'

	DNA sequence	aromatic amino acid sequence
1969)	5'-W G T G T T T W-3'	ImHpImHpHpHp-γ-PyPyPyPyPyPy
1970)	5'-W G T G T T A W-3'	ImHpImHpHpPy-γ-HpPyPyPyPyPy
1971)	5'-W G T G T T G W-3'	ImHpImHpHpIm-γ-PyPyPyPyPyPy
1972)	5'-W G T G T T C W-3'	ImHpImHpHpPy-γ-ImPyPyPyPyPy
1973)	5'-W G T G T A T W-3'	ImHpImHpPyHp-γ-PyHpPyPyPyPy
1974)	5'-W G T G T A A W-3'	ImHpImHpPyPy-γ-HpHpPyPyPyPy
1975)	5'-W G T G T A G W-3'	ImHpImHpPyIm-γ-PyHpPyPyPyPy
1976)	5'-W G T G T A C W-3'	ImHpImHpPyPy-γ-ImHpPyPyPyPy
1977)	5'-W G T G T G T W-3'	ImHpImHpImHp-γ-PyPyPyPyPyPy
1978)	5'-W G T G T G A W-3'	ImHpImHpImPy-γ-HpPyPyPyPyPy
1979)	5'-W G T G T G G W-3'	ImHpImHpImIm-γ-PyPyPyPyPyPy
1980)	5'-W G T G T G C W-3'	ImHpImHpImPy-γ-ImPyPyPyPyPy
1981)	5'-W G T G T C T W-3'	ImHpImHpPyHp-γ-PyImPyPyPyPy
1982)	5'-W G T G T C A W-3'	ImHpImHpPyPy-γ-HpImPyPyPyPy
1983)	5'-W G T G T C G W-3'	ImHpImHpPyIm-γ-PyImPyPyPyPy
1984)	5'-W G T G T C C W-3'	ImHpImHpPyPy-γ-ImImPyPyPyPy
1985)	5'-W G T G A T T W-3'	ImHpImPyHpHp-γ-PyPyHpPyPyPy
1986)	5'-W G T G A T A W-3'	ImHpImPyHpPy-γ-HpPyHpPyPyPy
1987)	5'-W G T G A T G W-3'	ImHpImPyHpIm-γ-PyPyHpPyPyPy
1988)	5'-W G T G A T C W-3'	ImHpImPyHpPy-γ-ImPyHpPyPyPy
1989)	5'-W G T G A A T W-3'	ImHpImPyPyHp-γ-PyHpHpPyPyPy
1990)	5'-W G T G A A A W-3'	ImHpImPyPyPy-γ-HpHpHpPyPyPy
1991)	5'-W G T G A A G W-3'	ImHpImPyPyIm-γ-PyHpHpPyPyPy
1992)	5'-W G T G A A C W-3'	ImHpImPyPyPy-γ-ImHpHpPyPyPy
1993)	5'-W G T G A G T W-3'	ImHpImPyImHp-γ-PyPyHpPyPyPy
1994)	5'-W G T G A G A W-3'	ImHpImPyImPy-γ-HpPyHpPyPyPy
1995)	5'-W G T G A G G W-3'	ImHpImPyImIm-γ-PyPyHpPyPyPy
1996)	5'-W G T G A G C W-3'	ImHpImPyImPy-γ-ImPyHpPyPyPy
1997)	5'-W G T G A C T W-3'	ImHpImPyPyHp-γ-PyImHpPyPyPy
1998)	5'-W G T G A C A W-3'	ImHpImPyPyPy-γ-HpImHpPyPyPy
1999)	5'-W G T G A C G W-3'	ImHpImPyPyIm-γ-PyImHpPyPyPy
2000)	5'-W G T G A C C W-3'	ImHpImPyPyPy-γ-ImImHpPyPyPy

TABLE 109: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTGSNNW-3'

	DNA sequence	aromatic amino acid sequence
2001)	5'-W G T G G T T W-3'	ImHpImImHpHp-γ-PyPyPyPyPyPy
2002)	5'-W G T G G T A W-3'	ImHpImImHpPy-γ-HpPyPyPyPyPy
2003)	5'-W G T G G T G W-3'	ImHpImImHpIm-γ-PyPyPyPyPyPy
2004)	5'-W G T G G T C W-3'	ImHpImImHpPy-γ-ImPyPyPyPyPy
2005)	5'-W G T G G A T W-3'	ImHpImImPyHp-γ-PyHpPyPyPyPy
2006)	5'-W G T G G A A W-3'	ImHpImImPyPy-γ-HpHpPyPyPyPy
2007)	5'-W G T G G A G W-3'	ImHpImImPyIm-γ-PyHpPyPyPyPy
2008)	5'-W G T G G A C W-3'	ImHpImImPyPy-γ-ImHpPyPyPyPy
2009)	5'-W G T G G G T W-3'	ImHpImImImHp-γ-PyPyPyPyPyPy
2010)	5'-W G T G G G A W-3'	ImHpImImImPy-γ-HpPyPyPyPyPy
2011)	5'-W G T G G C T W-3'	ImHpImImPyHp-γ-PyImPyPyPyPy
2012)	5'-W G T G G C A W-3'	ImHpImImPyPy-γ-HpImPyPyPyPy
2013)	5'-W G T G C T T W-3'	ImHpImPyHpHp-γ-PyPyImPyPyPy
2014)	5'-W G T G C T A W-3'	ImHpImPyHpPy-γ-HpPyImPyPyPy
2015)	5'-W G T G C T G W-3'	ImHpImPyHpIm-γ-PyPyImPyPyPy
2016)	5'-W G T G C T C W-3'	ImHpImPyHpPy-γ-ImPyImPyPyPy
2017)	5'-W G T G C A T W-3'	ImHpImPyPyHp-γ-PyHpImPyPyPy
2018)	5'-W G T G C A A W-3'	ImHpImPyPyPy-γ-HpHpImPyPyPy
2019)	5'-W G T G C A G W-3'	ImHpImPyPyIm-γ-PyHpImPyPyPy
2020)	5'-W G T G C A C W-3'	ImHpImPyPyPy-γ-ImHpImPyPyPy
2021)	5'-W G T G C G T W-3'	ImHpImPyImHp-γ-PyPyImPyPyPy
2022)	5'-W G T G C G A W-3'	ImHpImPyImPy-γ-HpPyImPyPyPy
2023)	5'-W G T G C C T W-3'	ImHpImPyPyHp-γ-PyImImPyPyPy
2024)	5'-W G T G C C A W-3'	ImHpImPyPyPy-γ-HpImImPyPyPy
2025)	5'-W G T G G G G W-3'	ImHpImImImIm-γ-PyPyPyPyPyPy
2026)	5'-W G T G G G C W-3'	ImHpImImImPy-γ-ImPyPyPyPyPy
2027)	5'-W G T G G C G W-3'	ImHpImImPyIm-γ-PyImPyPyPyPy
2028)	5'-W G T G G C C W-3'	ImHpImImPyPy-γ-ImImPyPyPyPy
2029)	5'-W G T G C G G W-3'	ImHpImPyImIm-γ-PyPyImPyPyPy
2030)	5'-W G T G C G C W-3'	ImHpImPyImPy-γ-ImPyImPyPyPy
2031)	5'-W G T G C C G W-3'	ImHpImPyPyIm-γ-PyImImPyPyPy
2032)	5'-W G T G C C C W-3'	ImHpImPyPyPy-γ-ImImImPyPyPy

TABLE 110: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTTWNNW-3'

	DNA sequence	aromatic amino acid sequence
2033)	5'-W G T T T T T W-3'	ImHpHpHpHpHp-γ-PyPyPyPyPyPy
2034)	5'-W G T T T T A W-3'	ImHpHpHpHpPy-γ-HpPyPyPyPyPy
2035)	5'-W G T T T T G W-3'	ImHpHpHpHpIm-γ-PyPyPyPyPyPy
2036)	5'-W G T T T T C W-3'	ImHpHpHpHpPy-γ-ImPyPyPyPyPy
2037)	5'-W G T T T A T W-3'	ImHpHpHpPyHp-γ-PyHpPyPyPyPy
2038)	5'-W G T T T A A W-3'	ImHpHpHpPyPy-γ-HpHpPyPyPyPy
2039)	5'-W G T T T A G W-3'	ImHpHpHpPyIm-γ-PyHpPyPyPyPy
2040)	5'-W G T T T A C W-3'	ImHpHpHpPyPy-γ-ImHpPyPyPyPy
2041)	5'-W G T T T G T W-3'	ImHpHpHpImHp-γ-PyPyPyPyPyPy
2042)	5'-W G T T T G A W-3'	ImHpHpHpImPy-γ-HpPyPyPyPyPy
2043)	5'-W G T T T G G W-3'	ImHpHpHpImIm-γ-PyPyPyPyPyPy
2044)	5'-W G T T T G C W-3'	ImHpHpHpImPy-γ-ImPyPyPyPyPy
2045)	5'-W G T T T C T W-3'	ImHpHpHpPyHp-γ-PyImPyPyPyPy
2046)	5'-W G T T T C A W-3'	ImHpHpHpPyPy-γ-HpImPyPyPyPy
2047)	5'-W G T T T C G W-3'	ImHpHpHpPyIm-γ-PyImPyPyPyPy
2048)	5'-W G T T T C C W-3'	ImHpHpHpPyPy-γ-ImImPyPyPyPy
2049)	5'-W G T T A T T W-3'	ImHpHpPyHpHp-γ-PyPyHpPyPyPy
2050)	5'-W G T T A T A W-3'	ImHpHpPyHpPy-γ-HpPyHpPyPyPy
2051)	5'-W G T T A T G W-3'	ImHpHpPyHpIm-γ-PyPyHpPyPyPy
2052)	5'-W G T T A T C W-3'	ImHpHpPyHpPy-γ-ImPyHpPyPyPy
2053)	5'-W G T T A A T W-3'	ImHpHpPyPyHp-γ-PyHpHpPyPyPy
2054)	5'-W G T T A A A W-3'	ImHpHpPyPyPy-γ-HpHpHpPyPyPy
2055)	5'-W G T T A A G W-3'	ImHpHpPyPyIm-γ-PyHpHpPyPyPy
2056)	5'-W G T T A A C W-3'	ImHpHpPyPyPy-γ-ImHpHpPyPyPy
2057)	5'-W G T T A G T W-3'	ImHpHpPyImHp-γ-PyPyHpPyPyPy
2058)	5'-W G T T A G A W-3'	ImHpHpPyImPy-γ-HpPyHpPyPyPy
2059)	5'-W G T T A G G W-3'	ImHpHpPyImIm-γ-PyPyHpPyPyPy
2060)	5'-W G T T A G C W-3'	ImHpHpPyImPy-γ-ImPyHpPyPyPy
2061)	5'-W G T T A C T W-3'	ImHpHpPyPyHp-γ-PyImHpPyPyPy
2062)	5'-W G T T A C A W-3'	ImHpHpPyPyPy-γ-HpImHpPyPyPy
2063)	5'-W G T T A C G W-3'	ImHpHpPyPyIm-γ-PyImHpPyPyPy
2064)	5'-W G T T A C C W-3'	ImHpHpPyPyPy-γ-ImImHpPyPyPy

TABLE 111: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTTSNNW-3'

	DNA sequence	aromatic amino acid sequence
2065)	5'-W G T T G T T W-3'	ImHpHpImHpHp-γ-PyPyPyPyPyPy
2066)	5'-W G T T G T A W-3'	ImHpHpImHpPy-γ-HpPyPyPyPyPy
2067)	5'-W G T T G T G W-3'	ImHpHpImHpIm-γ-PyPyPyPyPyPy
2068)	5'-W G T T G T C W-3'	ImHpHpImHpPy-γ-ImPyPyPyPyPy
2069)	5'-W G T T G A T W-3'	ImHpHpImPyHp-γ-PyHpPyPyPyPy
2070)	5'-W G T T G A A W-3'	ImHpHpImPyPy-γ-HpHpPyPyPyPy
2071)	5'-W G T T G A G W-3'	ImHpHpImPyIm-γ-PyHpPyPyPyPy
2072)	5'-W G T T G A C W-3'	ImHpHpImPyPy-γ-ImHpPyPyPyPy
2073)	5'-W G T T G G T W-3'	ImHpHpImImHp-γ-PyPyPyPyPyPy
2074)	5'-W G T T G G A W-3'	ImHpHpImImPy-γ-HpPyPyPyPyPy
2075)	5'-W G T T G C T W-3'	ImHpHpImPyHp-γ-PyImPyPyPyPy
2076)	5'-W G T T G C A W-3'	ImHpHpImPyPy-γ-HpImPyPyPyPy
2077)	5'-W G T T G G G W-3'	ImHpHpImImIm-γ-PyPyPyPyPyPy
2078)	5'-W G T T G G C W-3'	ImHpHpImImPy-γ-ImPyPyPyPyPy
2079)	5'-W G T T G C G W-3'	ImHpHpImPyIm-γ-PyImPyPyPyPy
2080)	5'-W G T T G C C W-3'	ImHpHpImPyPy-γ-ImImPyPyPyPy
2081)	5'-W G T T C T T W-3'	ImHpHpPyHpHp-γ-PyPyImPyPyPy
2082)	5'-W G T T C T A W-3'	ImHpHpPyHpPy-γ-HpPyImPyPyPy
2083)	5'-W G T T C T G W-3'	ImHpHpPyHpIm-γ-PyPyImPyPyPy
2084)	5'-W G T T C T C W-3'	ImHpHpPyHpPy-γ-ImPyImPyPyPy
2085)	5'-W G T T C A T W-3'	ImHpHpPyPyHp-γ-PyHpImPyPyPy
2086)	5'-W G T T C A A W-3'	ImHpHpPyPyPy-γ-HpHpImPyPyPy
2087)	5'-W G T T C A G W-3'	ImHpHpPyPyIm-γ-PyHpImPyPyPy
2088)	5'-W G T T C A C W-3'	ImHpHpPyPyPy-γ-ImHpImPyPyPy
2089)	5'-W G T T C G T W-3'	ImHpHpPyImHp-γ-PyPyImPyPyPy
2090)	5'-W G T T C G A W-3'	ImHpHpPyImPy-γ-HpPyImPyPyPy
2091)	5'-W G T T C C T W-3'	ImHpHpPyPyHp-γ-PyImImPyPyPy
2092)	5'-W G T T C C A W-3'	ImHpHpPyPyPy-γ-HpImImPyPyPy
2093)	5'-W G T T C G G W-3'	ImHpHpPyImIm-γ-PyPyImPyPyPy
2094)	5'-W G T T C G C W-3'	ImHpHpPyImPy-γ-ImPyImPyPyPy
2095)	5'-W G T T C C G W-3'	ImHpHpPyPyIm-γ-PyImImPyPyPy
2096)	5'-W G T T C C C W-3'	ImHpHpPyPyPy-γ-ImImImPyPyPy

TABLE 112: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTAWNNW-3'

DNA sequence	aromatic amino acid sequence
2097) 5'-W G T A T T T W-3'	ImHpPyHpHpHp-γ-PyPyPyHpPyPy
2098) 5'-W G T A T T A W-3'	ImHpPyHpHpPy-γ-HpPyPyHpPyPy
2099) 5'-W G T A T T G W-3'	ImHpPyHpHpIm-γ-PyPyPyHpPyPy
2100) 5'-W G T A T T C W-3'	ImHpPyHpHpPy-γ-ImPyPyHpPyPy
2101) 5'-W G T A T A T W-3'	ImHpPyHpPyHp-γ-PyHpPyHpPyPy
2102) 5'-W G T A T A A W-3'	ImHpPyHpPyPy-γ-HpHpPyHpPyPy
2103) 5'-W G T A T A G W-3'	ImHpPyHpPyIm-γ-PyHpPyHpPyPy
2104) 5'-W G T A T A C W-3'	ImHpPyHpPyPy-γ-ImHpPyHpPyPy
2105) 5'-W G T A T G T W-3'	ImHpPyHpImHp-γ-PyPyPyHpPyPy
2106) 5'-W G T A T G A W-3'	ImHpPyHpImPy-γ-HpPyPyHpPyPy
2107) 5'-W G T A T G G W-3'	ImHpPyHpImIm-γ-PyPyPyHpPyPy
2108) 5'-W G T A T G C W-3'	ImHpPyHpImPy-γ-ImPyPyHpPyPy
2109) 5'-W G T A T C T W-3'	ImHpPyHpPyHp-γ-PyImPyHpPyPy
2110) 5'-W G T A T C A W-3'	ImHpPyHpPyPy-γ-HpImPyHpPyPy
2111) 5'-W G T A T C G W-3'	ImHpPyHpPyIm-γ-PyImPyHpPyPy
2112) 5'-W G T A T C C W-3'	ImHpPyHpPyPy-γ-ImImPyHpPyPy
2113) 5'-W G T A A T T W-3'	ImHpPyPyHpHp-γ-PyPyHpHpPyPy
2114) 5'-W G T A A T A W-3'	ImHpPyPyHpPy-γ-HpPyHpHpPyPy
2115) 5'-W G T A A T G W-3'	ImHpPyPyHpIm-γ-PyPyHpHpPyPy
2116) 5'-W G T A A T C W-3'	ImHpPyPyHpPy-γ-ImPyHpHpPyPy
2117) 5'-W G T A A A T W-3'	ImHpPyPyPyHp-γ-PyHpHpHpPyPy
2118) 5'-W G T A A A A W-3'	ImHpPyPyPyPy-γ-HpHpHpHpPyPy
2119) 5'-W G T A A A G W-3'	ImHpPyPyPyIm-γ-PyHpHpHpPyPy
2120) 5'-W G T A A A C W-3'	ImHpPyPyPyPy-γ-ImHpHpHpPyPy
2121) 5'-W G T A A G T W-3'	ImHpPyPyImHp-γ-PyPyHpHpPyPy
2122) 5'-W G T A A G A W-3'	ImHpPyPyImPy-γ-HpPyHpHpPyPy
2123) 5'-W G T A A G G W-3'	ImHpPyPyImIm-γ-PyPyHpHpPyPy
2124) 5'-W G T A A G C W-3'	ImHpPyPyImPy-γ-ImPyHpHpPyPy
2125) 5'-W G T A A C T W-3'	ImHpPyPyPyHp-γ-PyImHpHpPyPy
2126) 5'-W G T A A C A W-3'	ImHpPyPyPyPy-γ-HpImHpHpPyPy
2127) 5'-W G T A A C G W-3'	ImHpPyPyPyIm-γ-PyImHpHpPyPy
2128) 5'-W G T A A C C W-3'	ImHpPyPyPyPy-γ-ImImHpHpPyPy

TABLE 113: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTASNNW-3'

	DNA sequence	aromatic amino acid sequence
2129)	5'-W G T A G T T W-3'	ImHpPyImHpHp-γ-PyPyPyHpPyPy
2130)	5'-W G T A G T A W-3'	ImHpPyImHpPy-γ-HpPyPyHpPyPy
2131)	5'-W G T A G T G W-3'	ImHpPyImHpIm-γ-PyPyPyHpPyPy
2132)	5'-W G T A G T C W-3'	ImHpPyImHpPy-γ-ImPyPyHpPyPy
2133)	5'-W G T A G A T W-3'	ImHpPyImPyHp-γ-PyHpPyHpPyPy
2134)	5'-W G T A G A A W-3'	ImHpPyImPyPy-γ-HpHpPyHpPyPy
2135)	5'-W G T A G A G W-3'	ImHpPyImPyIm-γ-PyHpPyHpPyPy
2136)	5'-W G T A G A C W-3'	ImHpPyImPyPy-γ-ImHpPyHpPyPy
2137)	5'-W G T A G G T W-3'	ImHpPyImImHp-γ-PyPyPyHpPyPy
2138)	5'-W G T A G G A W-3'	ImHpPyImImPy-γ-HpPyPyHpPyPy
2139)	5'-W G T A G C T W-3'	ImHpPyImPyHp-γ-PyImPyHpPyPy
2140)	5'-W G T A G C A W-3'	ImHpPyImPyPy-γ-HpImPyHpPyPy
2141)	5'-W G T A G G G W-3'	ImHpPyImImIm-γ-PyPyPyHpPyPy
2142)	5'-W G T A G G C W-3'	ImHpPyImImPy-γ-ImPyPyHpPyPy
2143)	5'-W G T A G C G W-3'	ImHpPyImPyIm-γ-PyImPyHpPyPy
2144)	5'-W G T A G C C W-3'	ImHpPyImPyPy-γ-ImImPyHpPyPy
2145)	5'-W G T A C T T W-3'	ImHpPyPyHpHp-γ-PyPyImHpPyPy
2146)	5'-W G T A C T A W-3'	ImHpPyPyHpPy-γ-HpPyImHpPyPy
2147)	5'-W G T A C T G W-3'	ImHpPyPyHpIm-γ-PyPyImHpPyPy
2148)	5'-W G T A C T C W-3'	ImHpPyPyHpPy-γ-ImPyImHpPyPy
2149)	5'-W G T A C A T W-3'	ImHpPyPyPyHp-γ-PyHpImHpPyPy
2150)	5'-W G T A C A A W-3'	ImHpPyPyPyPy-γ-HpHpImHpPyPy
2151)	5'-W G T A C A G W-3'	ImHpPyPyPyIm-γ-PyHpImHpPyPy
2152)	5'-W G T A C A C W-3'	ImHpPyPyPyPy-γ-ImHpImHpPyPy
2153)	5'-W G T A C G T W-3'	ImHpPyPyImHp-γ-PyPyImHpPyPy
2154)	5'-W G T A C G A W-3'	ImHpPyPyImPy-γ-HpPyImHpPyPy
2155)	5'-W G T A C C T W-3'	ImHpPyPyPyHp-γ-PyImImHpPyPy
2156)	5'-W G T A C C A W-3'	ImHpPyPyPyPy-γ-HpImImHpPyPy
2157)	5'-W G T A C G G W-3'	ImHpPyPyImIm-γ-PyPyImHpPyPy
2158)	5'-W G T A C G C W-3'	ImHpPyPyImPy-γ-ImPyImHpPyPy
2159)	5'-W G T A C C G W-3'	ImHpPyPyPyIm-γ-PyImImHpPyPy
2160)	5'-W G T A C C C W-3'	ImHpPyPyPyPy-γ-ImImImHpPyPy

TABLE 114: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTCWNNW-3'

DNA sequence	aromatic amino acid sequence
2161) 5'-W G T C T T T W-3'	ImHpPyHpHpHp-γ-PyPyPyImPyPy
2162) 5'-W G T C T T A W-3'	ImHpPyHpHpPy-γ-HpPyPyImPyPy
2163) 5'-W G T C T T G W-3'	ImHpPyHpHpIm-γ-PyPyPyImPyPy
2164) 5'-W G T C T T C W-3'	ImHpPyHpHpPy-γ-ImPyPyImPyPy
2165) 5'-W G T C T A T W-3'	ImHpPyHpPyHp-γ-PyHpPyImPyPy
2166) 5'-W G T C T A A W-3'	ImHpPyHpPyPy-γ-HpHpPyImPyPy
2167) 5'-W G T C T A G W-3'	ImHpPyHpPyIm-γ-PyHpPyImPyPy
2168) 5'-W G T C T A C W-3'	ImHpPyHpPyPy-γ-ImHpPyImPyPy
2169) 5'-W G T C T G T W-3'	ImHpPyHpImHp-γ-PyPyPyImPyPy
2170) 5'-W G T C T G A W-3'	ImHpPyHpImPy-γ-HpPyPyImPyPy
2171) 5'-W G T C T G G W-3'	ImHpPyHpImIm-γ-PyPyPyImPyPy
2172) 5'-W G T C T G C W-3'	ImHpPyHpImPy-γ-ImPyPyImPyPy
2173) 5'-W G T C T C T W-3'	ImHpPyHpPyHp-γ-PyImPyImPyPy
2174) 5'-W G T C T C A W-3'	ImHpPyHpPyPy-γ-HpImPyImPyPy
2175) 5'-W G T C T C G W-3'	ImHpPyHpPyIm-γ-PyImPyImPyPy
2176) 5'-W G T C T C C W-3'	ImHpPyHpPyPy-γ-ImImPyImPyPy
2177) 5'-W G T C A T T W-3'	ImHpPyPyHpHp-γ-PyPyHpImPyPy
2178) 5'-W G T C A T A W-3'	ImHpPyPyHpPy-γ-HpPyHpImPyPy
2179) 5'-W G T C A T G W-3'	ImHpPyPyHpIm-γ-PyPyHpImPyPy
2180) 5'-W G T C A T C W-3'	ImHpPyPyHpPy-γ-ImPyHpImPyPy
2181) 5'-W G T C A A T W-3'	ImHpPyPyPyHp-γ-PyHpHpImPyPy
2182) 5'-W G T C A A A W-3'	ImHpPyPyPyPy-γ-HpHpHpImPyPy
2183) 5'-W G T C A A G W-3'	ImHpPyPyPyIm-γ-PyHpHpImPyPy
2184) 5'-W G T C A A C W-3'	ImHpPyPyPyPy-γ-ImHpHpImPyPy
2185) 5'-W G T C A G T W-3'	ImHpPyPyImHp-γ-PyPyHpImPyPy
2186) 5'-W G T C A G A W-3'	ImHpPyPyImPy-γ-HpPyHpImPyPy
2187) 5'-W G T C A G G W-3'	ImHpPyPyImIm-γ-PyPyHpImPyPy
2188) 5'-W G T C A G C W-3'	ImHpPyPyImPy-γ-ImPyHpImPyPy
2189) 5'-W G T C A C T W-3'	ImHpPyPyPyHp-γ-PyImHpImPyPy
2190) 5'-W G T C A C A W-3'	ImHpPyPyPyPy-γ-HpImHpImPyPy
2191) 5'-W G T C A C G W-3'	ImHpPyPyPyIm-γ-PyImHpImPyPy
2192) 5'-W G T C A C C W-3'	ImHpPyPyPyPy-γ-ImImHpImPyPy

TABLE 115: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTCSNNW-3'

	DNA sequence	aromatic amino acid sequence
2193)	5'-W G T C G T T W-3'	ImHpPyImHpHp-γ-PyPyPyImPyPy
2194)	5'-W G T C G T A W-3'	ImHpPyImHpPy-γ-HpPyPyImPyPy
2195)	5'-W G T C G T G W-3'	ImHpPyImHpIm-γ-PyPyPyImPyPy
2196)	5'-W G T C G T C W-3'	ImHpPyImHpPy-γ-ImPyPyImPyPy
2197)	5'-W G T C G A T W-3'	ImHpPyImPyHp-γ-PyHpPyImPyPy
2198)	5'-W G T C G A A W-3'	ImHpPyImPyPy-γ-HpHpPyImPyPy
2199)	5'-W G T C G A G W-3'	ImHpPyImPyIm-γ-PyHpPyImPyPy
2200)	5'-W G T C G A C W-3'	ImHpPyImPyPy-γ-ImHpPyImPyPy
2201)	5'-W G T C G G T W-3'	ImHpPyImImHp-γ-PyPyPyImPyPy
2202)	5'-W G T C G G A W-3'	ImHpPyImImPy-γ-HpPyPyImPyPy
2203)	5'-W G T C G C T W-3'	ImHpPyImPyHp-γ-PyImPyImPyPy
2204)	5'-W G T C G C A W-3'	ImHpPyImPyPy-γ-HpImPyImPyPy
2205)	5'-W G T C C T T W-3'	ImHpPyPyHpHp-γ-PyPyImImPyPy
2206)	5'-W G T C C T A W-3'	ImHpPyPyHpPy-γ-HpPyImImPyPy
2207)	5'-W G T C C T G W-3'	ImHpPyPyHpIm-γ-PyPyImImPyPy
2208)	5'-W G T C C T C W-3'	ImHpPyPyHpPy-γ-ImPyImImPyPy
2209)	5'-W G T C C A T W-3'	ImHpPyPyPyHp-γ-PyHpImImPyPy
2210)	5'-W G T C C A A W-3'	ImHpPyPyPyPy-γ-HpHpImImPyPy
2211)	5'-W G T C C A G W-3'	ImHpPyPyPyIm-γ-PyHpImImPyPy
2212)	5'-W G T C C A C W-3'	ImHpPyPyPyPy-γ-ImHpImImPyPy
2213)	5'-W G T C C G T W-3'	ImHpPyPyImHp-γ-PyPyImImPyPy
2214)	5'-W G T C C G A W-3'	ImHpPyPyImPy-γ-HpPyImImPyPy
2215)	5'-W G T C C C T W-3'	ImHpPyPyPyHp-γ-PyImImImPyPy
2216)	5'-W G T C C C A W-3'	ImHpPyPyPyPy-γ-HpImImImPyPy
2217)	5'-W G T C G G G W-3'	ImHpPyImImIm-γ-PyPyPyImPyPy
2218)	5'-W G T C G G C W-3'	ImHpPyImImPy-γ-ImPyPyImPyPy
2219)	5'-W G T C G C G W-3'	ImHpPyImPyIm-γ-PyImPyImPyPy
2220)	5'-W G T C G C C W-3'	ImHpPyImPyPy-γ-ImImPyImPyPy
2221)	5'-W G T C C G G W-3'	ImHpPyPyImIm-γ-PyPyImImPyPy
2222)	5'-W G T C C G C W-3'	ImHpPyPyImPy-γ-ImPyImImPyPy
2223)	5'-W G T C C C G W-3'	ImHpPyPyPyIm-γ-PyImImImPyPy
2224)	5'-W G T C C C C W-3'	ImHpPyPyPyPy-γ-ImImImImPyPy

TABLE 116: 12-ring Hairpin Polyamides for recognition of 8-bp 5'WCGGWNNW-3'

	DNA sequence	aromatic amino acid sequence
2225)	5'W C G G T T T W-3'	PyImImHpHpHp-γ-PyPyPyPyPyIm
2226)	5'W C G G T T A W-3'	PyImImHpHpPy-γ-HpPyPyPyPyIm
2227)	5'W C G G T T G W-3'	PyImImHpHpIm-γ-PyPyPyPyPyIm
2228)	5'W C G G T T C W-3'	PyImImHpHpPy-γ-ImPyPyPyPyIm
2229)	5'W C G G T A T W-3'	PyImImHpPyHp-γ-PyHpPyPyPyIm
2230)	5'W C G G T A A W-3'	PyImImHpPyPy-γ-HpHpPyPyPyIm
2231)	5'W C G G T A G W-3'	PyImImHpPyIm-γ-PyHpPyPyPyIm
2232)	5'W C G G T A C W-3'	PyImImHpPyPy-γ-ImHpPyPyPyIm
2233)	5'W C G G T G T W-3'	PyImImHpImHp-γ-PyPyPyPyPyIm
2234)	5'W C G G T G A W-3'	PyImImHpImPy-γ-HpPyPyPyPyIm
2235)	5'W C G G T G G W-3'	PyImImHpImIm-γ-PyPyPyPyPyIm
2236)	5'W C G G T G C W-3'	PyImImHpImPy-γ-ImPyPyPyPyIm
2237)	5'W C G G T C T W-3'	PyImImHpPyHp-γ-PyImPyPyPyIm
2238)	5'W C G G T C A W-3'	PyImImHpPyPy-γ-HpImPyPyPyIm
2239)	5'W C G G T C G W-3'	PyImImHpPyIm-γ-PyImPyPyPyIm
2240)	5'W C G G T C C W-3'	PyImImHpPyPy-γ-ImImPyPyPyIm
2241)	5'W C G G A T T W-3'	PyImImPyHpHp-γ-PyPyHpPyPyIm
2242)	5'W C G G A T A W-3'	PyImImPyHpPy-γ-HpPyHpPyPyIm
2243)	5'W C G G A T G W-3'	PyImImPyHpIm-γ-PyPyHpPyPyIm
2244)	5'W C G G A T C W-3'	PyImImPyHpPy-γ-ImPyHpPyPyIm
2245)	5'W C G G A A T W-3'	PyImImPyPyHp-γ-PyHpHpPyPyIm
2246)	5'W C G G A A A W-3'	PyImImPyPyPy-γ-HpHpHpPyPyIm
2247)	5'W C G G A A G W-3'	PyImImPyPyIm-γ-PyHpHpPyPyIm
2248)	5'W C G G A A C W-3'	PyImImPyPyPy-γ-ImHpHpPyPyIm
2249)	5'W C G G A G T W-3'	PyImImPyImHp-γ-PyPyHpPyPyIm
2250)	5'W C G G A G A W-3'	PyImImPyImPy-γ-HpPyHpPyPyIm
2251)	5'W C G G A G G W-3'	PyImImPyImIm-γ-PyPyHpPyPyIm
2252)	5'W C G G A G C W-3'	PyImImPyImPy-γ-ImPyHpPyPyIm
2253)	5'W C G G A C T W-3'	PyImImPyPyHp-γ-PyImHpPyPyIm
2254)	5'W C G G A C A W-3'	PyImImPyPyPy-γ-HpImHpPyPyIm
2255)	5'W C G G A C G W-3'	PyImImPyPyIm-γ-PyImHpPyPyIm
2256)	5'W C G G A C C W-3'	PyImImPyPyPy-γ-ImImHpPyPyIm

TABLE 117: 12-ring Hairpin Polyamides for recognition of 8-bp 5'WCGGSNNW-3'

	DNA sequence	aromatic amino acid sequence
2257)	5'W C G G G T T W-3'	PyImImImHpHp-γ-PyPyPyPyPyIm
2258)	5'W C G G G T A W-3'	PyImImImHpPy-γ-HpPyPyPyPyIm
2259)	5'W C G G G T G W-3'	PyImImImHpIm-γ-PyPyPyPyPyIm
2260)	5'W C G G G T C W-3'	PyImImImHpPy-γ-ImPyPyPyPyIm
2261)	5'W C G G G A T W-3'	PyImImImPyHp-γ-PyHpPyPyPyIm
2262)	5'W C G G G A A W-3'	PyImImImPyPy-γ-HpHpPyPyPyIm
2263)	5'W C G G G A G W-3'	PyImImImPyIm-γ-PyHpPyPyPyIm
2264)	5'W C G G G A C W-3'	PyImImImPyPy-γ-ImHpPyPyPyIm
2265)	5'W C G G G G T W-3'	PyImImImImHp-γ-PyPyPyPyPyIm
2266)	5'W C G G G G A W-3'	PyImImImImPy-γ-HpPyPyPyPyIm
2267)	5'W C G G G C T W-3'	PyImImImPyHp-γ-PyImPyPyPyIm
2268)	5'W C G G G C A W-3'	PyImImImPyPy-γ-HpImPyPyPyIm
2269)	5'W C G G C T T W-3'	PyImImPyHpHp-γ-PyPyImPyPyIm
2270)	5'W C G G C T A W-3'	PyImImPyHpPy-γ-HpPyImPyPyIm
2271)	5'W C G G C T G W-3'	PyImImPyHpIm-γ-PyPyImPyPyIm
2272)	5'W C G G C T C W-3'	PyImImPyHpPy-γ-ImPyImPyPyIm
2273)	5'W C G G C A T W-3'	PyImImPyPyHp-γ-PyHpImPyPyIm
2274)	5'W C G G C A A W-3'	PyImImPyPyPy-γ-HpHpImPyPyIm
2275)	5'W C G G C A G W-3'	PyImImPyPyIm-γ-PyHpImPyPyIm
2276)	5'W C G G C A C W-3'	PyImImPyPyPy-γ-ImHpImPyPyIm
2277)	5'W C G G C G T W-3'	PyImImPyImHp-γ-PyPyImPyPyIm
2278)	5'W C G G C G A W-3'	PyImImPyImPy-γ-HpPyImPyPyIm
2279)	5'W C G G C C T W-3'	PyImImPyPyHp-γ-PyImImPyPyIm
2280)	5'W C G G C C A W-3'	PyImImPyPyPy-γ-HpImImPyPyIm
G83)	5'W C G G G G G W-3'	PyImImImImIm-γ-PyPyPyPyPyIm
G84)	5'W C G G G G C W-3'	PyImImImImPy-γ-ImPyPyPyPyIm
G85)	5'W C G G G C G W-3'	PyImImImPyIm-γ-PyImPyPyPyIm
G86)	5'W C G G G C C W-3'	PyImImImPyPy-γ-ImImPyPyPyIm
G87)	5'W C G G C G G W-3'	PyImImPyImIm-γ-PyPyImPyPyIm
G88)	5'W C G G C G C W-3'	PyImImPyImPy-γ-ImPyImPyPyIm
G89)	5'W C G G C C G W-3'	PyImImPyPyIm-γ-PyImImPyPyIm
G90)	5'W C G G C C C W-3'	PyImImPyPyPy-γ-ImImImPyPyIm

TABLE 118: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGTWNNW-3'

	DNA sequence	aromatic amino acid sequence
2281)	5'W C G T T T T W-3'	PyImHpHpHpHp-γ-PyPyPyPyPyIm
2282)	5'W C G T T T A W-3'	PyImHpHpHpPy-γ-HpPyPyPyPyIm
2283)	5'W C G T T T G W-3'	PyImHpHpHpIm-γ-PyPyPyPyPyIm
2284)	5'W C G T T T C W-3'	PyImHpHpHpPy-γ-ImPyPyPyPyIm
2285)	5'W C G T T A T W-3'	PyImHpHpPyHp-γ-PyHpPyPyPyIm
2286)	5'W C G T T A A W-3'	PyImHpHpPyPy-γ-HpHpPyPyPyIm
2287)	5'W C G T T A G W-3'	PyImHpHpPyIm-γ-PyHpPyPyPyIm
2288)	5'W C G T T A C W-3'	PyImHpHpPyPy-γ-ImHpPyPyPyIm
2289)	5'W C G T T G T W-3'	PyImHpHpImHp-γ-PyPyPyPyPyIm
2290)	5'W C G T T G A W-3'	PyImHpHpImPy-γ-HpPyPyPyPyIm
2291)	5'W C G T T G G W-3'	PyImHpHpImIm-γ-PyPyPyPyPyIm
2292)	5'W C G T T G C W-3'	PyImHpHpImPy-γ-ImPyPyPyPyIm
2293)	5'W C G T T C T W-3'	PyImHpHpPyHp-γ-PyImPyPyPyIm
2294)	5'W C G T T C A W-3'	PyImHpHpPyPy-γ-HpImPyPyPyIm
2295)	5'W C G T T C G W-3'	PyImHpHpPyIm-γ-PyImPyPyPyIm
2296)	5'W C G T T C C W-3'	PyImHpHpPyPy-γ-ImImPyPyPyIm
2297)	5'W C G T A T T W-3'	PyImHpPyHpHp-γ-PyPyHpPyPyIm
2298)	5'W C G T A T A W-3'	PyImHpPyHpPy-γ-HpPyHpPyPyIm
2299)	5'W C G T A T G W-3'	PyImHpPyHpIm-γ-PyPyHpPyPyIm
2300)	5'W C G T A T C W-3'	PyImHpPyHpPy-γ-ImPyHpPyPyIm
2301)	5'W C G T A A T W-3'	PyImHpPyPyHp-γ-PyHpHpPyPyIm
2302)	5'W C G T A A A W-3'	PyImHpPyPyPy-γ-HpHpHpPyPyIm
2303)	5'W C G T A A G W-3'	PyImHpPyPyIm-γ-PyHpHpPyPyIm
2304)	5'W C G T A A C W-3'	PyImHpPyPyPy-γ-ImHpHpPyPyIm
2305)	5'W C G T A G T W-3'	PyImHpPyImHp-γ-PyPyHpPyPyIm
2306)	5'W C G T A G A W-3'	PyImHpPyImPy-γ-HpPyHpPyPyIm
2307)	5'W C G T A G G W-3'	PyImHpPyImIm-γ-PyPyHpPyPyIm
2308)	5'W C G T A G C W-3'	PyImHpPyImPy-γ-ImPyHpPyPyIm
2309)	5'W C G T A C T W-3'	PyImHpPyPyHp-γ-PyImHpPyPyIm
2310)	5'W C G T A C A W-3'	PyImHpPyPyPy-γ-HpImHpPyPyIm
2311)	5'W C G T A C G W-3'	PyImHpPyPyIm-γ-PyImHpPyPyIm
2312)	5'W C G T A C C W-3'	PyImHpPyPyPy-γ-ImImHpPyPyIm

TABLE 119: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGTSNNW-3'

	DNA sequence	aromatic amino acid sequence
2313)	5'W C G T G T T W-3'	PyImHpImHpHp-γ-PyPyPyPyPyIm
2314)	5'W C G T G T A W-3'	PyImHpImHpPy-γ-HpPyPyPyPyIm
2315)	5'W C G T G T G W-3'	PyImHpImHpIm-γ-PyPyPyPyPyIm
2316)	5'W C G T G T C W-3'	PyImHpImHpPy-γ-ImPyPyPyPyIm
2317)	5'W C G T G A T W-3'	PyImHpImPyHp-γ-PyHpPyPyPyIm
2318)	5'W C G T G A A W-3'	PyImHpImPyPy-γ-HpHpPyPyPyIm
2319)	5'W C G T G A G W-3'	PyImHpImPyIm-γ-PyHpPyPyPyIm
2320)	5'W C G T G A C W-3'	PyImHpImPyPy-γ-ImHpPyPyPyIm
2321)	5'W C G T G G T W-3'	PyImHpImImHp-γ-PyPyPyPyPyIm
2322)	5'W C G T G G A W-3'	PyImHpImImPy-γ-HpPyPyPyPyIm
2323)	5'W C G T G C T W-3'	PyImHpImPyHp-γ-PyImPyPyPyIm
2324)	5'W C G T G C A W-3'	PyImHpImPyPy-γ-HpImPyPyPyIm
2325)	5'W C G T G G G W-3'	PyImHpImImIm-γ-PyPyPyPyPyIm
2326)	5'W C G T G G C W-3'	PyImHpImImPy-γ-ImPyPyPyPyIm
2327)	5'W C G T G C G W-3'	PyImHpImPyIm-γ-PyImPyPyPyIm
2328)	5'W C G T G C C W-3'	PyImHpImPyPy-γ-ImImPyPyPyIm
2329)	5'W C G T C T T W-3'	PyImHpPyHpHp-γ-PyPyImPyPyIm
2330)	5'W C G T C T A W-3'	PyImHpPyHpPy-γ-HpPyImPyPyIm
2331)	5'W C G T C T G W-3'	PyImHpPyHpIm-γ-PyPyImPyPyIm
2332)	5'W C G T C T C W-3'	PyImHpPyHpPy-γ-ImPyImPyPyIm
2333)	5'W C G T C A T W-3'	PyImHpPyPyHp-γ-PyHpImPyPyIm
2334)	5'W C G T C A A W-3'	PyImHpPyPyPy-γ-HpHpImPyPyIm
2335)	5'W C G T C A G W-3'	PyImHpPyPyIm-γ-PyHpImPyPyIm
2336)	5'W C G T C A C W-3'	PyImHpPyPyPy-γ-ImHpImPyPyIm
2337)	5'W C G T C G T W-3'	PyImHpPyImHp-γ-PyPyImPyPyIm
2338)	5'W C G T C G A W-3'	PyImHpPyImPy-γ-HpPyImPyPyIm
2339)	5'W C G T C C T W-3'	PyImHpPyPyHp-γ-PyImImPyPyIm
2340)	5'W C G T C C A W-3'	PyImHpPyPyPy-γ-HpImImPyPyIm
2341)	5'W C G T C G G W-3'	PyImHpPyImIm-γ-PyPyImPyPyIm
2342)	5'W C G T C G C W-3'	PyImHpPyImPy-γ-ImPyImPyPyIm
2343)	5'W C G T C C G W-3'	PyImHpPyPyIm-γ-PyImImPyPyIm
2344)	5'W C G T C C C W-3'	PyImHpPyPyPy-γ-ImImImPyPyIm

TABLE 120: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGAWNNW-3'

DNA sequence	aromatic amino acid sequence
2345) 5'W C G A T T T W-3'	PyImPyHpHpHp-γ-PyPyPyHpPyIm
2346) 5'W C G A T T A W-3'	PyImPyHpHpPy-γ-HpPyPyHpPyIm
2347) 5'W C G A T T G W-3'	PyImPyHpHpIm-γ-PyPyPyHpPyIm
2348) 5'W C G A T T C W-3'	PyImPyHpHpPy-γ-ImPyPyHpPyIm
2349) 5'W C G A T A T W-3'	PyImPyHpPyHp-γ-PyHpPyHpPyIm
2350) 5'W C G A T A A W-3'	PyImPyHpPyPy-γ-HpHpPyHpPyIm
2351) 5'W C G A T A G W-3'	PyImPyHpPyIm-γ-PyHpPyHpPyIm
2352) 5'W C G A T A C W-3'	PyImPyHpPyPy-γ-ImHpPyHpPyIm
2353) 5'W C G A T G T W-3'	PyImPyHpImHp-γ-PyPyPyHpPyIm
2354) 5'W C G A T G A W-3'	PyImPyHpImPy-γ-HpPyPyHpPyIm
2355) 5'W C G A T G G W-3'	PyImPyHpImIm-γ-PyPyPyHpPyIm
2356) 5'W C G A T G C W-3'	PyImPyHpImPy-γ-ImPyPyHpPyIm
2357) 5'W C G A T C T W-3'	PyImPyHpPyHp-γ-PyImPyHpPyIm
2358) 5'W C G A T C A W-3'	PyImPyHpPyPy-γ-HpImPyHpPyIm
2359) 5'W C G A T C G W-3'	PyImPyHpPyIm-γ-PyImPyHpPyIm
2360) 5'W C G A T C C W-3'	PyImPyHpPyPy-γ-ImImPyHpPyIm
2361) 5'W C G A A T T W-3'	PyImPyPyHpHp-γ-PyPyHpHpPyIm
2362) 5'W C G A A T A W-3'	PyImPyPyHpPy-γ-HpPyHpHpPyIm
2363) 5'W C G A A T G W-3'	PyImPyPyHpIm-γ-PyPyHpHpPyIm
2364) 5'W C G A A T C W-3'	PyImPyPyHpPy-γ-ImPyHpHpPyIm
2365) 5'W C G A A A T W-3'	PyImPyPyPyHp-γ-PyHpHpHpPyIm
2366) 5'W C G A A A A W-3'	PyImPyPyPyPy-γ-HpHpHpHpPyIm
2367) 5'W C G A A A G W-3'	PyImPyPyPyIm-γ-PyHpHpHpPyIm
2368) 5'W C G A A A C W-3'	PyImPyPyPyPy-γ-ImHpHpHpPyIm
2369) 5'W C G A A G T W-3'	PyImPyPyImHp-γ-PyPyHpHpPyIm
2370) 5'W C G A A G A W-3'	PyImPyPyImPy-γ-HpPyHpHpPyIm
2371) 5'W C G A A G G W-3'	PyImPyPyImIm-γ-PyPyHpHpPyIm
2372) 5'W C G A A G C W-3'	PyImPyPyImPy-γ-ImPyHpHpPyIm
2373) 5'W C G A A C T W-3'	PyImPyPyPyHp-γ-PyImHpHpPyIm
2374) 5'W C G A A C A W-3'	PyImPyPyPyPy-γ-HpImHpHpPyIm
2375) 5'W C G A A C G W-3'	PyImPyPyPyIm-γ-PyImHpHpPyIm
2376) 5'W C G A A C C W-3'	PyImPyPyPyPy-γ-ImImHpHpPyIm

TABLE 121: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGASNNW-3'

	DNA sequence	aromatic amino acid sequence
2377)	5'W C G A G T T W-3'	PyImPyImHpHp-γ-PyPyPyHpPyIm
2378)	5'W C G A G T A W-3'	PyImPyImHpPy-γ-HpPyPyHpPyIm
2379)	5'W C G A G T G W-3'	PyImPyImHpIm-γ-PyPyPyHpPyIm
2380)	5'W C G A G T C W-3'	PyImPyImHpPy-γ-ImPyPyHpPyIm
2381)	5'W C G A G A T W-3'	PyImPyImPyHp-γ-PyHpPyHpPyIm
2382)	5'W C G A G A A W-3'	PyImPyImPyPy-γ-HpHpPyHpPyIm
2383)	5'W C G A G A G W-3'	PyImPyImPyIm-γ-PyHpPyHpPyIm
2384)	5'W C G A G A C W-3'	PyImPyImPyPy-γ-ImHpPyHpPyIm
2385)	5'W C G A G G T W-3'	PyImPyImImHp-γ-PyPyPyHpPyIm
2386)	5'W C G A G G A W-3'	PyImPyImImPy-γ-HpPyPyHpPyIm
2387)	5'W C G A G C T W-3'	PyImPyImPyHp-γ-PyImPyHpPyIm
2388)	5'W C G A G C A W-3'	PyImPyImPyPy-γ-HpImPyHpPyIm
2389)	5'W C G A G G G W-3'	PyImPyImImIm-γ-PyPyPyHpPyIm
2390)	5'W C G A G G C W-3'	PyImPyImImPy-γ-ImPyPyHpPyIm
2391)	5'W C G A G C G W-3'	PyImPyImPyIm-γ-PyImPyHpPyIm
2392)	5'W C G A G C C W-3'	PyImPyImPyPy-γ-ImImPyHpPyIm
2393)	5'W C G A C T T W-3'	PyImPyPyHpHp-γ-PyPyImHpPyIm
2394)	5'W C G A C T A W-3'	PyImPyPyHpPy-γ-HpPyImHpPyIm
2395)	5'W C G A C T G W-3'	PyImPyPyHpIm-γ-PyPyImHpPyIm
2396)	5'W C G A C T C W-3'	PyImPyPyHpPy-γ-ImPyImHpPyIm
2397)	5'W C G A C A T W-3'	PyImPyPyPyHp-γ-PyHpImHpPyIm
2398)	5'W C G A C A A W-3'	PyImPyPyPyPy-γ-HpHpImHpPyIm
2399)	5'W C G A C A G W-3'	PyImPyPyPyIm-γ-PyHpImHpPyIm
2400)	5'W C G A C A C W-3'	PyImPyPyPyPy-γ-ImHpImHpPyIm
2401)	5'W C G A C G T W-3'	PyImPyPyImHp-γ-PyPyImHpPyIm
2402)	5'W C G A C G A W-3'	PyImPyPyImPy-γ-HpPyImHpPyIm
2403)	5'W C G A C C T W-3'	PyImPyPyPyHp-γ-PyImImHpPyIm
2404)	5'W C G A C C A W-3'	PyImPyPyPyPy-γ-HpImImHpPyIm
2405)	5'W C G A C G G W-3'	PyImPyPyImIm-γ-PyPyImHpPyIm
2406)	5'W C G A C G C W-3'	PyImPyPyImPy-γ-ImPyImHpPyIm
2407)	5'W C G A C C G W-3'	PyImPyPyPyIm-γ-PyImImHpPyIm
2408)	5'W C G A C C C W-3'	PyImPyPyPyPy-γ-ImImImHpPyIm

TABLE 122: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGCWNNW-3'

DNA sequence	aromatic amino acid sequence
2409) 5'W C G C T T T W-3'	PyImPyHpHpHp-γ-PyPyPyImPyIm
2410) 5'W C G C T T A W-3'	PyImPyHpHpPy-γ-HpPyPyImPyIm
2411) 5'W C G C T T G W-3'	PyImPyHpHpIm-γ-PyPyPyImPyIm
2412) 5'W C G C T T C W-3'	PyImPyHpHpPy-γ-ImPyPyImPyIm
2413) 5'W C G C T A T W-3'	PyImPyHpPyHp-γ-PyHpPyImPyIm
2414) 5'W C G C T A A W-3'	PyImPyHpPyPy-γ-HpHpPyImPyIm
2415) 5'W C G C T A G W-3'	PyImPyHpPyIm-γ-PyHpPyImPyIm
2416) 5'W C G C T A C W-3'	PyImPyHpPyPy-γ-ImHpPyImPyIm
2417) 5'W C G C T G T W-3'	PyImPyHpImHp-γ-PyPyPyImPyIm
2418) 5'W C G C T G A W-3'	PyImPyHpImPy-γ-HpPyPyImPyIm
2419) 5'W C G C T G G W-3'	PyImPyHpImIm-γ-PyPyPyImPyIm
2420) 5'W C G C T G C W-3'	PyImPyHpImPy-γ-ImPyPyImPyIm
2421) 5'W C G C T C T W-3'	PyImPyHpPyHp-γ-PyImPyImPyIm
2422) 5'W C G C T C A W-3'	PyImPyHpPyPy-γ-HpImPyImPyIm
2423) 5'W C G C T C G W-3'	PyImPyHpPyIm-γ-PyImPyImPyIm
2424) 5'W C G C T C C W-3'	PyImPyHpPyPy-γ-ImImPyImPyIm
2425) 5'W C G C A T T W-3'	PyImPyPyHpHp-γ-PyPyHpImPyIm
2426) 5'W C G C A T A W-3'	PyImPyPyHpPy-γ-HpPyHpImPyIm
2427) 5'W C G C A T G W-3'	PyImPyPyHpIm-γ-PyPyHpImPyIm
2428) 5'W C G C A T C W-3'	PyImPyPyHpPy-γ-ImPyHpImPyIm
2429) 5'W C G C A A T W-3'	PyImPyPyPyHp-γ-PyHpHpImPyIm
2430) 5'W C G C A A A W-3'	PyImPyPyPyPy-γ-HpHpHpImPyIm
2431) 5'W C G C A A G W-3'	PyImPyPyPyIm-γ-PyHpHpImPyIm
2432) 5'W C G C A A C W-3'	PyImPyPyPyPy-γ-ImHpHpImPyIm
2433) 5'W C G C A G T W-3'	PyImPyPyImHp-γ-PyPyHpImPyIm
2434) 5'W C G C A G A W-3'	PyImPyPyImPy-γ-HpPyHpImPyIm
2435) 5'W C G C A G G W-3'	PyImPyPyImIm-γ-PyPyHpImPyIm
2436) 5'W C G C A G C W-3'	PyImPyPyImPy-γ-ImPyHpImPyIm
2437) 5'W C G C A C T W-3'	PyImPyPyPyHp-γ-PyImHpImPyIm
2438) 5'W C G C A C A W-3'	PyImPyPyPyPy-γ-HpImHpImPyIm
2439) 5'W C G C A C G W-3'	PyImPyPyPyIm-γ-PyImHpImPyIm
2440) 5'W C G C A C C W-3'	PyImPyPyPyPy-γ-ImImHpImPyIm

TABLE 123: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGCSNNW-3'

DNA sequence	aromatic amino acid sequence
2441) 5'W C G C G T T W-3'	PyImPyImHpHp-γ-PyPyPyImPyIm
2442) 5'W C G C G T A W-3'	PyImPyImHpPy-γ-HpPyPyImPyIm
2443) 5'W C G C G T G W-3'	PyImPyImHpIm-γ-PyPyPyImPyIm
2444) 5'W C G C G T C W-3'	PyImPyImHpPy-γ-ImPyPyImPyIm
2445) 5'W C G C G A T W-3'	PyImPyImPyHp-γ-PyHpPyImPyIm
2446) 5'W C G C G A A W-3'	PyImPyImPyPy-γ-HpHpPyImPyIm
2447) 5'W C G C G A G W-3'	PyImPyImPyIm-γ-PyHpPyImPyIm
2448) 5'W C G C G A C W-3'	PyImPyImPyPy-γ-ImHpPyImPyIm
2449) 5'W C G C G G T W-3'	PyImPyImImHp-γ-PyPyPyImPyIm
2450) 5'W C G C G G A W-3'	PyImPyImImPy-γ-HpPyPyImPyIm
2451) 5'W C G C G C T W-3'	PyImPyImPyHp-γ-PyImPyImPyIm
2452) 5'W C G C G C A W-3'	PyImPyImPyPy-γ-HpImPyImPyIm
2453) 5'W C G C C T T W-3'	PyImPyPyHpHp-γ-PyPyImImPyIm
2454) 5'W C G C C T A W-3'	PyImPyPyHpPy-γ-HpPyImImPyIm
2455) 5'W C G C C T G W-3'	PyImPyPyHpIm-γ-PyPyImImPyIm
2456) 5'W C G C C T C W-3'	PyImPyPyHpPy-γ-ImPyImImPyIm
2457) 5'W C G C C A T W-3'	PyImPyPyPyHp-γ-PyHpImImPyIm
2458) 5'W C G C C A A W-3'	PyImPyPyPyPy-γ-HpHpImImPyIm
2459) 5'W C G C C A G W-3'	PyImPyPyPyIm-γ-PyHpImImPyIm
2460) 5'W C G C C A C W-3'	PyImPyPyPyPy-γ-ImHpImImPyIm
2461) 5'W C G C C G T W-3'	PyImPyPyImHp-γ-PyPyImImPyIm
2462) 5'W C G C C G A W-3'	PyImPyPyImPy-γ-HpPyImImPyIm
2463) 5'W C G C C C T W-3'	PyImPyPyPyHp-γ-PyImImImPyIm
2464) 5'W C G C C C A W-3'	PyImPyPyPyPy-γ-HpImImImPyIm
G91) 5'W C G C G G G W-3'	PyImPyImImIm-γ-PyPyPyImPyIm
G92) 5'W C G C G G C W-3'	PyImPyImImPy-γ-ImPyPyImPyIm
G93) 5'W C G C G C G W-3'	PyImPyImPyIm-γ-PyImPyImPyIm
G94) 5'W C G C G C C W-3'	PyImPyImPyPy-γ-ImImPyImPyIm
G95) 5'W C G C C G G W-3'	PyImPyPyImIm-γ-PyPyImImPyIm
G96) 5'W C G C C G C W-3'	PyImPyPyImPy-γ-ImPyImImPyIm
G97) 5'W C G C C C G W-3'	PyImPyPyPyIm-γ-PyImImImPyIm
G98) 5'W C G C C C C W-3'	PyImPyPyPyPy-γ-ImImImImPyIm

TABLE 124: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCGWNNW-3'

DNA sequence	aromatic amino acid sequence
2465) 5'W C C G T T T W-3'	PyPyImHpHpHp-γ-PyPyPyPyImIm
2466) 5'W C C G T T A W-3'	PyPyImHpHpPy-γ-HpPyPyPyImIm
2467) 5'W C C G T T G W-3'	PyPyImHpHpIm-γ-PyPyPyPyImIm
2468) 5'W C C G T T C W-3'	PyPyImHpHpPy-γ-ImPyPyPyImIm
2469) 5'W C C G T A T W-3'	PyPyImHpPyHp-γ-PyHpPyPyImIm
2470) 5'W C C G T A A W-3'	PyPyImHpPyPy-γ-HpHpPyPyImIm
2471) 5'W C C G T A G W-3'	PyPyImHpPyIm-γ-PyHpPyPyImIm
2472) 5'W C C G T A C W-3'	PyPyImHpPyPy-γ-ImHpPyPyImIm
2473) 5'W C C G T G T W-3'	PyPyImHpImHp-γ-PyPyPyPyImIm
2474) 5'W C C G T G A W-3'	PyPyImHpImPy-γ-HpPyPyPyImIm
2475) 5'W C C G T G G W-3'	PyPyImHpImIm-γ-PyPyPyPyImIm
2476) 5'W C C G T G C W-3'	PyPyImHpImPy-γ-ImPyPyPyImIm
2477) 5'W C C G T C T W-3'	PyPyImHpPyHp-γ-PyImPyPyImIm
2478) 5'W C C G T C A W-3'	PyPyImHpPyPy-γ-HpImPyPyImIm
2479) 5'W C C G T C G W-3'	PyPyImHpPyIm-γ-PyImPyPyImIm
2480) 5'W C C G T C C W-3'	PyPyImHpPyPy-γ-ImImPyPyImIm
2481) 5'W C C G A T T W-3'	PyPyImPyHpHp-γ-PyPyHpPyImIm
2482) 5'W C C G A T A W-3'	PyPyImPyHpPy-γ-HpPyHpPyImIm
2483) 5'W C C G A T G W-3'	PyPyImPyHpIm-γ-PyPyHpPyImIm
2484) 5'W C C G A T C W-3'	PyPyImPyHpPy-γ-ImPyHpPyImIm
2485) 5'W C C G A A T W-3'	PyPyImPyPyHp-γ-PyHpHpPyImIm
2486) 5'W C C G A A A W-3'	PyPyImPyPyPy-γ-HpHpHpPyImIm
2487) 5'W C C G A A G W-3'	PyPyImPyPyIm-γ-PyHpHpPyImIm
2488) 5'W C C G A A C W-3'	PyPyImPyPyPy-γ-ImHpHpPyImIm
2489) 5'W C C G A G T W-3'	PyPyImPyImHp-γ-PyPyHpPyImIm
2490) 5'W C C G A G A W-3'	PyPyImPyImPy-γ-HpPyHpPyImIm
2491) 5'W C C G A G G W-3'	PyPyImPyImIm-γ-PyPyHpPyImIm
2492) 5'W C C G A G C W-3'	PyPyImPyImPy-γ-ImPyHpPyImIm
2493) 5'W C C G A C T W-3'	PyPyImPyPyHp-γ-PyImHpPyImIm
2494) 5'W C C G A C A W-3'	PyPyImPyPyPy-γ-HpImHpPyImIm
2495) 5'W C C G A C G W-3'	PyPyImPyPyIm-γ-PyImHpPyImIm
2496) 5'W C C G A C C W-3'	PyPyImPyPyPy-γ-ImImHpPyImIm

TABLE 125: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCGSNNW-3'

	DNA sequence	aromatic amino acid sequence
2497)	5'W C C G G T T W-3'	PyPyImImHpHp-γ-PyPyPyPyImIm
2498)	5'W C C G G T A W-3'	PyPyImImHpPy-γ-HpPyPyPyImIm
2499)	5'W C C G G T G W-3'	PyPyImImHpIm-γ-PyPyPyPyImIm
2500)	5'W C C G G T C W-3'	PyPyImImHpPy-γ-ImPyPyPyImIm
2501)	5'W C C G G A T W-3'	PyPyImImPyHp-γ-PyHpPyPyImIm
2502)	5'W C C G G A A W-3'	PyPyImImPyPy-γ-HpHpPyPyImIm
2503)	5'W C C G G A G W-3'	PyPyImImPyIm-γ-PyHpPyPyImIm
2504)	5'W C C G G A C W-3'	PyPyImImPyPy-γ-ImHpPyPyImIm
2505)	5'W C C G G G T W-3'	PyPyImImImHp-γ-PyPyPyPyImIm
2506)	5'W C C G G G A W-3'	PyPyImImImPy-γ-HpPyPyPyImIm
2507)	5'W C C G G C T W-3'	PyPyImImPyHp-γ-PyImPyPyImIm
2508)	5'W C C G G C A W-3'	PyPyImImPyPy-γ-HpImPyPyImIm
2509)	5'W C C G C T T W-3'	PyPyImPyHpHp-γ-PyPyImPyImIm
2510)	5'W C C G C T A W-3'	PyPyImPyHpPy-γ-HpPyImPyImIm
2511)	5'W C C G C T G W-3'	PyPyImPyHpIm-γ-PyPyImPyImIm
2512)	5'W C C G C T C W-3'	PyPyImPyHpPy-γ-ImPyImPyImIm
2513)	5'W C C G C A T W-3'	PyPyImPyPyHp-γ-PyHpImPyImIm
2514)	5'W C C G C A A W-3'	PyPyImPyPyPy-γ-HpHpImPyImIm
2515)	5'W C C G C A G W-3'	PyPyImPyPyIm-γ-PyHpImPyImIm
2516)	5'W C C G C A C W-3'	PyPyImPyPyPy-γ-ImHpImPyImIm
2517)	5'W C C G C G T W-3'	PyPyImPyImHp-γ-PyPyImPyImIm
2518)	5'W C C G C G A W-3'	PyPyImPyImPy-γ-HpPyImPyImIm
2519)	5'W C C G C C T W-3'	PyPyImPyPyHp-γ-PyImImPyImIm
2520)	5'W C C G C C A W-3'	PyPyImPyPyPy-γ-HpImImPyImIm
G99)	5'W C C G G G G W-3'	PyPyImImImIm-γ-PyPyPyPyImIm
G100)	5'W C C G G G C W-3'	PyPyImImImPy-γ-ImPyPyPyImIm
G101)	5'W C C G G C G W-3'	PyPyImImPyIm-γ-PyImPyPyImIm
G102)	5'W C C G G C C W-3'	PyPyImImPyPy-γ-ImImPyPyImIm
G103)	5'W C C G C G G W-3'	PyPyImPyImIm-γ-PyPyImPyImIm
G104)	5'W C C G C G C W-3'	PyPyImPyImPy-γ-ImPyImPyImIm
G105)	5'W C C G C C G W-3'	PyPyImPyPyIm-γ-PyImImPyImIm
G106)	5'W C C G C C C W-3'	PyPyImPyPyPy-γ-ImImImPyImIm

TABLE 126: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCTWNNW-3'

	DNA sequence	aromatic amino acid sequence
2521)	5'W C C T T T T W-3'	PyPyHpHpHpHp-γ-PyPyPyPyImIm
2522)	5'W C C T T T A W-3'	PyPyHpHpHpPy-γ-HpPyPyPyImIm
2523)	5'W C C T T T G W-3'	PyPyHpHpHpIm-γ-PyPyPyPyImIm
2524)	5'W C C T T T C W-3'	PyPyHpHpHpPy-γ-ImPyPyPyImIm
2525)	5'W C C T T A T W-3'	PyPyHpHpPyHp-γ-PyHpPyPyImIm
2526)	5'W C C T T A A W-3'	PyPyHpHpPyPy-γ-HpHpPyPyImIm
2527)	5'W C C T T A G W-3'	PyPyHpHpPyIm-γ-PyHpPyPyImIm
2528)	5'W C C T T A C W-3'	PyPyHpHpPyPy-γ-ImHpPyPyImIm
2529)	5'W C C T T G T W-3'	PyPyHpHpImHp-γ-PyPyPyPyImIm
2530)	5'W C C T T G A W-3'	PyPyHpHpImPy-γ-HpPyPyPyImIm
2531)	5'W C C T T G G W-3'	PyPyHpHpImIm-γ-PyPyPyPyImIm
2532)	5'W C C T T G C W-3'	PyPyHpHpImPy-γ-ImPyPyPyImIm
2533)	5'W C C T T C T W-3'	PyPyHpHpPyHp-γ-PyImPyPyImIm
2534)	5'W C C T T C A W-3'	PyPyHpHpPyPy-γ-HpImPyPyImIm
2535)	5'W C C T T C G W-3'	PyPyHpHpPyIm-γ-PyImPyPyImIm
2536)	5'W C C T T C C W-3'	PyPyHpHpPyPy-γ-ImImPyPyImIm
2537)	5'W C C T A T T W-3'	PyPyHpPyHpHp-γ-PyPyHpPyImIm
2538)	5'W C C T A T A W-3'	PyPyHpPyHpPy-γ-HpPyHpPyImIm
2539)	5'W C C T A T G W-3'	PyPyHpPyHpIm-γ-PyPyHpPyImIm
2540)	5'W C C T A T C W-3'	PyPyHpPyHpPy-γ-ImPyHpPyImIm
2541)	5'W C C T A A T W-3'	PyPyHpPyPyHp-γ-PyHpHpPyImIm
2542)	5'W C C T A A A W-3'	PyPyHpPyPyPy-γ-HpHpHpPyImIm
2543)	5'W C C T A A G W-3'	PyPyHpPyPyIm-γ-PyHpHpPyImIm
2544)	5'W C C T A A C W-3'	PyPyHpPyPyPy-γ-ImHpHpPyImIm
2545)	5'W C C T A G T W-3'	PyPyHpPyImHp-γ-PyPyHpPyImIm
2546)	5'W C C T A G A W-3'	PyPyHpPyImPy-γ-HpPyHpPyImIm
2547)	5'W C C T A G G W-3'	PyPyHpPyImIm-γ-PyPyHpPyImIm
2548)	5'W C C T A G C W-3'	PyPyHpPyImPy-γ-ImPyHpPyImIm
2549)	5'W C C T A C T W-3'	PyPyHpPyPyHp-γ-PyImHpPyImIm
2550)	5'W C C T A C A W-3'	PyPyHpPyPyPy-γ-HpImHpPyImIm
2551)	5'W C C T A C G W-3'	PyPyHpPyPyIm-γ-PyImHpPyImIm
2552)	5'W C C T A C C W-3'	PyPyHpPyPyPy-γ-ImImHpPyImIm

TABLE 127: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCTSNNW-3'

DNA sequence	aromatic amino acid sequence
2553) 5'W C C T G T T W-3'	PyPyHpImHpHp-γ-PyPyPyPyImIm
2554) 5'W C C T G T A W-3'	PyPyHpImHpPy-γ-HpPyPyPyImIm
2555) 5'W C C T G T G W-3'	PyPyHpImHpIm-γ-PyPyPyPyImIm
2556) 5'W C C T G T C W-3'	PyPyHpImHpPy-γ-ImPyPyPyImIm
2557) 5'W C C T G A T W-3'	PyPyHpImPyHp-γ-PyHpPyPyImIm
2558) 5'W C C T G A A W-3'	PyPyHpImPyPy-γ-HpHpPyPyImIm
2559) 5'W C C T G A G W-3'	PyPyHpImPyIm-γ-PyHpPyPyImIm
2560) 5'W C C T G A C W-3'	PyPyHpImPyPy-γ-ImHpPyPyImIm
2561) 5'W C C T G G T W-3'	PyPyHpImImHp-γ-PyPyPyPyImIm
2562) 5'W C C T G G A W-3'	PyPyHpImImPy-γ-HpPyPyPyImIm
2563) 5'W C C T G C T W-3'	PyPyHpImPyHp-γ-PyImPyPyImIm
2564) 5'W C C T G C A W-3'	PyPyHpImPyPy-γ-HpImPyPyImIm
2565) 5'W C C T G G G W-3'	PyPyHpImImIm-γ-PyPyPyPyImIm
2566) 5'W C C T G G C W-3'	PyPyHpImImPy-γ-ImPyPyPyImIm
2567) 5'W C C T G C G W-3'	PyPyHpImPyIm-γ-PyImPyPyImIm
2568) 5'W C C T G C C W-3'	PyPyHpImPyPy-γ-ImImPyPyImIm
2569) 5'W C C T C T T W-3'	PyPyHpPyHpHp-γ-PyPyImPyImIm
2570) 5'W C C T C T A W-3'	PyPyHpPyHpPy-γ-HpPyImPyImIm
2571) 5'W C C T C T G W-3'	PyPyHpPyHpIm-γ-PyPyImPyImIm
2572) 5'W C C T C T C W-3'	PyPyHpPyHpPy-γ-ImPyImPyImIm
2573) 5'W C C T C A T W-3'	PyPyHpPyPyHp-γ-PyHpImPyImIm
2574) 5'W C C T C A A W-3'	PyPyHpPyPyPy-γ-HpHpImPyImIm
2575) 5'W C C T C A G W-3'	PyPyHpPyPyIm-γ-PyHpImPyImIm
2576) 5'W C C T C A C W-3'	PyPyHpPyPyPy-γ-ImHpImPyImIm
2577) 5'W C C T C G T W-3'	PyPyHpPyImHp-γ-PyPyImPyImIm
2578) 5'W C C T C G A W-3'	PyPyHpPyImPy-γ-HpPyImPyImIm
2579) 5'W C C T C C T W-3'	PyPyHpPyPyHp-γ-PyImImPyImIm
2580) 5'W C C T C C A W-3'	PyPyHpPyPyPy-γ-HpImImPyImIm
2581) 5'W C C T C G G W-3'	PyPyHpPyImIm-γ-PyPyImPyImIm
2582) 5'W C C T C G C W-3'	PyPyHpPyImPy-γ-ImPyImPyImIm
2583) 5'W C C T C C G W-3'	PyPyHpPyPyIm-γ-PyImImPyImIm
2584) 5'W C C T C C C W-3'	PyPyHpPyPyPy-γ-ImImImPyImIm

TABLE 128: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCAWNNW-3'

DNA sequence	aromatic amino acid sequence
2585) 5'W C C A T T T W-3'	PyPyPyHpHpHp-γ-PyPyPyHpImIm
2586) 5'W C C A T T A W-3'	PyPyPyHpHpPy-γ-HpPyPyHpImIm
2587) 5'W C C A T T G W-3'	PyPyPyHpHpIm-γ-PyPyPyHpImIm
2588) 5'W C C A T T C W-3'	PyPyPyHpHpPy-γ-ImPyPyHpImIm
2589) 5'W C C A T A T W-3'	PyPyPyHpPyHp-γ-PyHpPyHpImIm
2590) 5'W C C A T A A W-3'	PyPyPyHpPyPy-γ-HpHpPyHpImIm
2591) 5'W C C A T A G W-3'	PyPyPyHpPyIm-γ-PyHpPyHpImIm
2592) 5'W C C A T A C W-3'	PyPyPyHpPyPy-γ-ImHpPyHpImIm
2593) 5'W C C A T G T W-3'	PyPyPyHpImHp-γ-PyPyPyHpImIm
2594) 5'W C C A T G A W-3'	PyPyPyHpImPy-γ-HpPyPyHpImIm
2595) 5'W C C A T G G W-3'	PyPyPyHpImIm-γ-PyPyPyHpImIm
2596) 5'W C C A T G C W-3'	PyPyPyHpImPy-γ-ImPyPyHpImIm
2597) 5'W C C A T C T W-3'	PyPyPyHpPyHp-γ-PyImPyHpImIm
2598) 5'W C C A T C A W-3'	PyPyPyHpPyPy-γ-HpImPyHpImIm
2599) 5'W C C A T C G W-3'	PyPyPyHpPyIm-γ-PyImPyHpImIm
2600) 5'W C C A T C C W-3'	PyPyPyHpPyPy-γ-ImImPyHpImIm
2601) 5'W C C A A T T W-3'	PyPyPyPyHpHp-γ-PyPyHpHpImIm
2602) 5'W C C A A T A W-3'	PyPyPyPyHpPy-γ-HpPyHpHpImIm
2603) 5'W C C A A T G W-3'	PyPyPyPyHpIm-γ-PyPyHpHpImIm
2604) 5'W C C A A T C W-3'	PyPyPyPyHpPy-γ-ImPyHpHpImIm
2605) 5'W C C A A A T W-3'	PyPyPyPyPyHp-γ-PyHpHpHpImIm
2606) 5'W C C A A A A W-3'	PyPyPyPyPyPy-γ-HpHpHpHpImIm
2607) 5'W C C A A A G W-3'	PyPyPyPyPyIm-γ-PyHpHpHpImIm
2608) 5'W C C A A A C W-3'	PyPyPyPyPyPy-γ-ImHpHpHpImIm
2609) 5'W C C A A G T W-3'	PyPyPyPyImHp-γ-PyPyHpHpImIm
2610) 5'W C C A A G A W-3'	PyPyPyPyImPy-γ-HpPyHpHpImIm
2611) 5'W C C A A G G W-3'	PyPyPyPyImIm-γ-PyPyHpHpImIm
2612) 5'W C C A A G C W-3'	PyPyPyPyImPy-γ-ImPyHpHpImIm
2613) 5'W C C A A C T W-3'	PyPyPyPyPyHp-γ-PyImHpHpImIm
2614) 5'W C C A A C A W-3'	PyPyPyPyPyPy-γ-HpImHpHpImIm
2615) 5'W C C A A C G W-3'	PyPyPyPyPyIm-γ-PyImHpHpImIm
2616) 5'W C C A A C C W-3'	PyPyPyPyPyPy-γ-ImImHpHpImIm

TABLE 129: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCASNNW-3'

	DNA sequence	aromatic amino acid sequence
2617)	5'W C C A G T T W-3'	PyPyPyImHpHp-γ-PyPyPyHpImIm
2618)	5'W C C A G T A W-3'	PyPyPyImHpPy-γ-HpPyPyHpImIm
2619)	5'W C C A G T G W-3'	PyPyPyImHpIm-γ-PyPyPyHpImIm
2620)	5'W C C A G T C W-3'	PyPyPyImHpPy-γ-ImPyPyHpImIm
2621)	5'W C C A G A T W-3'	PyPyPyImPyHp-γ-PyHpPyHpImIm
2622)	5'W C C A G A A W-3'	PyPyPyImPyPy-γ-HpHpPyHpImIm
2623)	5'W C C A G A G W-3'	PyPyPyImPyIm-γ-PyHpPyHpImIm
2624)	5'W C C A G A C W-3'	PyPyPyImPyPy-γ-ImHpPyHpImIm
2625)	5'W C C A G G T W-3'	PyPyPyImImHp-γ-PyPyPyHpImIm
2626)	5'W C C A G G A W-3'	PyPyPyImImPy-γ-HpPyPyHpImIm
2627)	5'W C C A G C T W-3'	PyPyPyImPyHp-γ-PyImPyHpImIm
2628)	5'W C C A G C A W-3'	PyPyPyImPyPy-γ-HpImPyHpImIm
2629)	5'W C C A G G G W-3'	PyPyPyImImIm-γ-PyPyPyHpImIm
2630)	5'W C C A G G C W-3'	PyPyPyImImPy-γ-ImPyPyHpImIm
2631)	5'W C C A G C G W-3'	PyPyPyImPyIm-γ-PyImPyHpImIm
2632)	5'W C C A G C C W-3'	PyPyPyImPyPy-γ-ImImPyHpImIm
2633)	5'W C C A C T T W-3'	PyPyPyPyHpHp-γ-PyPyImHpImIm
2634)	5'W C C A C T A W-3'	PyPyPyPyHpPy-γ-HpPyImHpImIm
2635)	5'W C C A C T G W-3'	PyPyPyPyHpIm-γ-PyPyImHpImIm
2636)	5'W C C A C T C W-3'	PyPyPyPyHpPy-γ-ImPyImHpImIm
2637)	5'W C C A C A T W-3'	PyPyPyPyPyHp-γ-PyHpImHpImIm
2638)	5'W C C A C A A W-3'	PyPyPyPyPyPy-γ-HpHpImHpImIm
2639)	5'W C C A C A G W-3'	PyPyPyPyPyIm-γ-PyHpImHpImIm
2640)	5'W C C A C A C W-3'	PyPyPyPyPyPy-γ-ImHpImHpImIm
2641)	5'W C C A C G T W-3'	PyPyPyPyImHp-γ-PyPyImHpImIm
2642)	5'W C C A C G A W-3'	PyPyPyPyImPy-γ-HpPyImHpImIm
2643)	5'W C C A C C T W-3'	PyPyPyPyPyHp-γ-PyImImHpImIm
2644)	5'W C C A C C A W-3'	PyPyPyPyPyPy-γ-HpImImHpImIm
2645)	5'W C C A C G G W-3'	PyPyPyPyImIm-γ-PyPyImHpImIm
2646)	5'W C C A C G C W-3'	PyPyPyPyImPy-γ-ImPyImHpImIm
2647)	5'W C C A C C G W-3'	PyPyPyPyPyIm-γ-PyImImHpImIm
2648)	5'W C C A C C C W-3'	PyPyPyPyPyPy-γ-ImImImHpImIm

TABLE 130: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCCWNNW-3'

DNA sequence	aromatic amino acid sequence
2649) 5'W C C C T T T W-3'	PyPyPyHpHpHp-γ-PyPyPyImImIm
2650) 5'W C C C T T A W-3'	PyPyPyHpHpPy-γ-HpPyPyImImIm
2651) 5'W C C C T T G W-3'	PyPyPyHpHpIm-γ-PyPyPyImImIm
2652) 5'W C C C T T C W-3'	PyPyPyHpHpPy-γ-ImPyPyImImIm
2653) 5'W C C C T A T W-3'	PyPyPyHpPyHp-γ-PyHpPyImImIm
2654) 5'W C C C T A A W-3'	PyPyPyHpPyPy-γ-HpHpPyImImIm
2655) 5'W C C C T A G W-3'	PyPyPyHpPyIm-γ-PyHpPyImImIm
2656) 5'W C C C T A C W-3'	PyPyPyHpPyPy-γ-ImHpPyImImIm
2657) 5'W C C C T G T W-3'	PyPyPyHpImHp-γ-PyPyPyImImIm
2658) 5'W C C C T G A W-3'	PyPyPyHpImPy-γ-HpPyPyImImIm
2659) 5'W C C C T G G W-3'	PyPyPyHpImIm-γ-PyPyPyImImIm
2660) 5'W C C C T G C W-3'	PyPyPyHpImPy-γ-ImPyPyImImIm
2661) 5'W C C C T C T W-3'	PyPyPyHpPyHp-γ-PyImPyImImIm
2662) 5'W C C C T C A W-3'	PyPyPyHpPyPy-γ-HpImPyImImIm
2663) 5'W C C C T C G W-3'	PyPyPyHpPyIm-γ-PyImPyImImIm
2664) 5'W C C C T C C W-3'	PyPyPyHpPyPy-γ-ImImPyImImIm
2665) 5'W C C C A T T W-3'	PyPyPyPyHpHp-γ-PyPyHpImImIm
2666) 5'W C C C A T A W-3'	PyPyPyPyHpPy-γ-HpPyHpImImIm
2667) 5'W C C C A T G W-3'	PyPyPyPyHpIm-γ-PyPyHpImImIm
2668) 5'W C C C A T C W-3'	PyPyPyPyHpPy-γ-ImPyHpImImIm
2669) 5'W C C C A A T W-3'	PyPyPyPyPyHp-γ-PyHpHpImImIm
2670) 5'W C C C A A A W-3'	PyPyPyPyPyPy-γ-HpHpHpImImIm
2671) 5'W C C C A A G W-3'	PyPyPyPyPyIm-γ-PyHpHpImImIm
2672) 5'W C C C A A C W-3'	PyPyPyPyPyPy-γ-ImHpHpImImIm
2673) 5'W C C C A G T W-3'	PyPyPyPyImHp-γ-PyPyHpImImIm
2674) 5'W C C C A G A W-3'	PyPyPyPyImPy-γ-HpPyHpImImIm
2675) 5'W C C C A G G W-3'	PyPyPyPyImIm-γ-PyPyHpImImIm
2676) 5'W C C C A G C W-3'	PyPyPyPyImPy-γ-ImPyHpImImIm
2677) 5'W C C C A C T W-3'	PyPyPyPyPyHp-γ-PyImHpImImIm
2678) 5'W C C C A C A W-3'	PyPyPyPyPyPy-γ-HpImHpImImIm
2679) 5'W C C C A C G W-3'	PyPyPyPyPyIm-γ-PyImHpImImIm
2680) 5'W C C C A C C W-3'	PyPyPyPyPyPy-γ-ImImHpImImIm

TABLE 131: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCCSNNW-3'

	DNA sequence	aromatic amino acid sequence
2681)	5'W C C C G T T W-3'	PyPyPyImHpHp-γ-PyPyPyImImIm
2682)	5'W C C C G T A W-3'	PyPyPyImHpPy-γ-HpPyPyImImIm
2683)	5'W C C C G T G W-3'	PyPyPyImHpIm-γ-PyPyPyImImIm
2684)	5'W C C C G T C W-3'	PyPyPyImHpPy-γ-ImPyPyImImIm
2685)	5'W C C C G A T W-3'	PyPyPyImPyHp-γ-PyHpPyImImIm
2686)	5'W C C C G A A W-3'	PyPyPyImPyPy-γ-HpHpPyImImIm
2687)	5'W C C C G A G W-3'	PyPyPyImPyIm-γ-PyHpPyImImIm
2688)	5'W C C C G A C W-3'	PyPyPyImPyPy-γ-ImHpPyImImIm
2689)	5'W C C C G G T W-3'	PyPyPyImImHp-γ-PyPyPyImImIm
2690)	5'W C C C G G A W-3'	PyPyPyImImPy-γ-HpPyPyImImIm
2691)	5'W C C C G C T W-3'	PyPyPyImPyHp-γ-PyImPyImImIm
2692)	5'W C C C G C A W-3'	PyPyPyImPyPy-γ-HpImPyImImIm
2693)	5'W C C C C T T W-3'	PyPyPyPyHpHp-γ-PyPyImImImIm
2694)	5'W C C C C T A W-3'	PyPyPyPyHpPy-γ-HpPyImImImIm
2695)	5'W C C C C T G W-3'	PyPyPyPyHpIm-γ-PyPyImImImIm
2696)	5'W C C C C T C W-3'	PyPyPyPyHpPy-γ-ImPyImImImIm
2697)	5'W C C C C A T W-3'	PyPyPyPyPyHp-γ-PyHpImImImIm
2698)	5'W C C C C A A W-3'	PyPyPyPyPyPy-γ-HpHpImImImIm
2699)	5'W C C C C A G W-3'	PyPyPyPyPyIm-γ-PyHpImImImIm
2690)	5'W C C C C A C W-3'	PyPyPyPyPyPy-γ-ImHpImImImIm
2701)	5'W C C C C G T W-3'	PyPyPyPyImHp-γ-PyPyImImImIm
2702)	5'W C C C C G A W-3'	PyPyPyPyImPy-γ-HpPyImImImIm
2703)	5'W C C C C C T W-3'	PyPyPyPyPyHp-γ-PyImImImImIm
2704)	5'W C C C C C A W-3'	PyPyPyPyPyPy-γ-HpImImImImIm
G107)	5'W C C C G G G W-3'	PyPyPyImImIm-γ-PyPyPyImImIm
G108)	5'W C C C G G C W-3'	PyPyPyImImPy-γ-ImPyPyImImIm
G109)	5'W C C C G C G W-3'	PyPyPyImPyIm-γ-PyImPyImImIm
G110)	5'W C C C G C C W-3'	PyPyPyImPyPy-γ-ImImPyImImIm
G111)	5'W C C C C G G W-3'	PyPyPyPyImIm-γ-PyPyImImImIm
G112)	5'W C C C C G C W-3'	PyPyPyPyImPy-γ-ImPyImImImIm
G113)	5'W C C C C C G W-3'	PyPyPyPyPyIm-γ-PyImImImImIm
G114)	5'W C C C C C C W-3'	PyPyPyPyPyPy-γ-ImImImImImIm

TABLE 132: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCAGWNNW-3'

	DNA sequence	aromatic amino acid sequence
2705)	5'W C A G T T T W-3'	PyPyImHpHpHp-γ-PyPyPyPyHpIm
2706)	5'W C A G T T A W-3'	PyPyImHpHpPy-γ-HpPyPyPyHpIm
2707)	5'W C A G T T G W-3'	PyPyImHpHpIm-γ-PyPyPyPyHpIm
2708)	5'W C A G T T C W-3'	PyPyImHpHpPy-γ-ImPyPyPyHpIm
2709)	5'W C A G T A T W-3'	PyPyImHpPyHp-γ-PyHpPyPyHpIm
2700)	5'W C A G T A A W-3'	PyPyImHpPyPy-γ-HpHpPyPyHpIm
2711)	5'W C A G T A G W-3'	PyPyImHpPyIm-γ-PyHpPyPyHpIm
2712)	5'W C A G T A C W-3'	PyPyImHpPyPy-γ-ImHpPyPyHpIm
2713)	5'W C A G T G T W-3'	PyPyImHpImHp-γ-PyPyPyPyHpIm
2714)	5'W C A G T G A W-3'	PyPyImHpImPy-γ-HpPyPyPyHpIm
2715)	5'W C A G T G G W-3'	PyPyImHpImIm-γ-PyPyPyPyHpIm
2716)	5'W C A G T G C W-3'	PyPyImHpImPy-γ-ImPyPyPyHpIm
2717)	5'W C A G T C T W-3'	PyPyImHpPyHp-γ-PyImPyPyHpIm
2718)	5'W C A G T C A W-3'	PyPyImHpPyPy-γ-HpImPyPyHpIm
2719)	5'W C A G T C G W-3'	PyPyImHpPyIm-γ-PyImPyPyHpIm
2720)	5'W C A G T C C W-3'	PyPyImHpPyPy-γ-ImImPyPyHpIm
2721)	5'W C A G A T T W-3'	PyPyImPyHpHp-γ-PyPyHpPyHpIm
2722)	5'W C A G A T A W-3'	PyPyImPyHpPy-γ-HpPyHpPyHpIm
2723)	5'W C A G A T G W-3'	PyPyImPyHpIm-γ-PyPyHpPyHpIm
2724)	5'W C A G A T C W-3'	PyPyImPyHpPy-γ-ImPyHpPyHpIm
2725)	5'W C A G A A T W-3'	PyPyImPyPyHp-γ-PyHpHpPyHpIm
2726)	5'W C A G A A A W-3'	PyPyImPyPyPy-γ-HpHpHpPyHpIm
2727)	5'W C A G A A G W-3'	PyPyImPyPyIm-γ-PyHpHpPyHpIm
2728)	5'W C A G A A C W-3'	PyPyImPyPyPy-γ-ImHpHpPyHpIm
2729)	5'W C A G A G T W-3'	PyPyImPyImHp-γ-PyPyHpPyHpIm
2730)	5'W C A G A G A W-3'	PyPyImPyImPy-γ-HpPyHpPyHpIm
2731)	5'W C A G A G G W-3'	PyPyImPyImIm-γ-PyPyHpPyHpIm
2732)	5'W C A G A G C W-3'	PyPyImPyImPy-γ-ImPyHpPyHpIm
2733)	5'W C A G A C T W-3'	PyPyImPyPyHp-γ-PyImHpPyHpIm
2734)	5'W C A G A C A W-3'	PyPyImPyPyPy-γ-HpImHpPyHpIm
2735)	5'W C A G A C G W-3'	PyPyImPyPyIm-γ-PyImHpPyHpIm
2736)	5'W C A G A C C W-3'	PyPyImPyPyPy-γ-ImImHpPyHpIm

TABLE 133: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCAGSNNW-3'

DNA sequence	aromatic amino acid sequence
2737) 5'W C A G G T T W-3'	PyPyImImHpHp-γ-PyPyPyPyHpIm
2738) 5'W C A G G T A W-3'	PyPyImImHpPy-γ-HpPyPyPyHpIm
2739) 5'W C A G G T G W-3'	PyPyImImHpIm-γ-PyPyPyPyHpIm
2740) 5'W C A G G T C W-3'	PyPyImImHpPy-γ-ImPyPyPyHpIm
2741) 5'W C A G G A T W-3'	PyPyImImPyHp-γ-PyHpPyPyHpIm
2742) 5'W C A G G A A W-3'	PyPyImImPyPy-γ-HpHpPyPyHpIm
2743) 5'W C A G G A G W-3'	PyPyImImPyIm-γ-PyHpPyPyHpIm
2744) 5'W C A G G A C W-3'	PyPyImImPyPy-γ-ImHpPyPyHpIm
2745) 5'W C A G G G T W-3'	PyPyImImImHp-γ-PyPyPyPyHpIm
2746) 5'W C A G G G A W-3'	PyPyImImImPy-γ-HpPyPyPyHpIm
2747) 5'W C A G G C T W-3'	PyPyImImPyHp-γ-PyImPyPyHpIm
2748) 5'W C A G G C A W-3'	PyPyImImPyPy-γ-HpImPyPyHpIm
2749) 5'W C A G C T T W-3'	PyPyImPyHpHp-γ-PyPyImPyHpIm
2750) 5'W C A G C T A W-3'	PyPyImPyHpPy-γ-HpPyImPyHpIm
2751) 5'W C A G C T G W-3'	PyPyImPyHpIm-γ-PyPyImPyHpIm
2752) 5'W C A G C T C W-3'	PyPyImPyHpPy-γ-ImPyImPyHpIm
2753) 5'W C A G C A T W-3'	PyPyImPyPyHp-γ-PyHpImPyHpIm
2754) 5'W C A G C A A W-3'	PyPyImPyPyPy-γ-HpHpImPyHpIm
2755) 5'W C A G C A G W-3'	PyPyImPyPyIm-γ-PyHpImPyHpIm
2756) 5'W C A G C A C W-3'	PyPyImPyPyPy-γ-ImHpImPyHpIm
2757) 5'W C A G C G T W-3'	PyPyImPyImHp-γ-PyPyImPyHpIm
2758) 5'W C A G C G A W-3'	PyPyImPyImPy-γ-HpPyImPyHpIm
2759) 5'W C A G C C T W-3'	PyPyImPyPyHp-γ-PyImImPyHpIm
2760) 5'W C A G C C A W-3'	PyPyImPyPyPy-γ-HpImImPyHpIm
2761) 5'W C A G G G G W-3'	PyPyImImImIm-γ-PyPyPyPyHpIm
2762) 5'W C A G G G C W-3'	PyPyImImImPy-γ-ImPyPyPyHpIm
2763) 5'W C A G G C G W-3'	PyPyImImPyIm-γ-PyImPyPyHpIm
2764) 5'W C A G G C C W-3'	PyPyImImPyPy-γ-ImImPyPyHpIm
2765) 5'W C A G C G G W-3'	PyPyImPyImIm-γ-PyPyImPyHpIm
2766) 5'W C A G C G C W-3'	PyPyImPyImPy-γ-ImPyImPyHpIm
2767) 5'W C A G C C G W-3'	PyPyImPyPyIm-γ-PyImImPyHpIm
2768) 5'W C A G C C C W-3'	PyPyImPyPyPy-γ-ImImImPyHpIm

TABLE 134: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCATWNNW-3'

	DNA sequence	aromatic amino acid sequence
2769)	5'W C A T T T T W-3'	PyPyHpHpHpHp-γ-PyPyPyPyHpIm
2770)	5'W C A T T T A W-3'	PyPyHpHpHpPy-γ-HpPyPyPyHpIm
2771)	5'W C A T T T G W-3'	PyPyHpHpHpIm-γ-PyPyPyPyHpIm
2772)	5'W C A T T T C W-3'	PyPyHpHpHpPy-γ-ImPyPyPyHpIm
2773)	5'W C A T T A T W-3'	PyPyHpHpPyHp-γ-PyHpPyPyHpIm
2774)	5'W C A T T A A W-3'	PyPyHpHpPyPy-γ-HpHpPyPyHpIm
2775)	5'W C A T T A G W-3'	PyPyHpHpPyIm-γ-PyHpPyPyHpIm
2776)	5'W C A T T A C W-3'	PyPyHpHpPyPy-γ-ImHpPyPyHpIm
2777)	5'W C A T T G T W-3'	PyPyHpHpImHp-γ-PyPyPyPyHpIm
2778)	5'W C A T T G A W-3'	PyPyHpHpImPy-γ-HpPyPyPyHpIm
2779)	5'W C A T T G G W-3'	PyPyHpHpImIm-γ-PyPyPyPyHpIm
2780)	5'W C A T T G C W-3'	PyPyHpHpImPy-γ-ImPyPyPyHpIm
2781)	5'W C A T T C T W-3'	PyPyHpHpPyHp-γ-PyImPyPyHpIm
2782)	5'W C A T T C A W-3'	PyPyHpHpPyPy-γ-HpImPyPyHpIm
2783)	5'W C A T T C G W-3'	PyPyHpHpPyIm-γ-PyImPyPyHpIm
2784)	5'W C A T T C C W-3'	PyPyHpHpPyPy-γ-ImImPyPyHpIm
2785)	5'W C A T A T T W-3'	PyPyHpPyHpHp-γ-PyPyHpPyHpIm
2786)	5'W C A T A T A W-3'	PyPyHpPyHpPy-γ-HpPyHpPyHpIm
2787)	5'W C A T A T G W-3'	PyPyHpPyHpIm-γ-PyPyHpPyHpIm
2788)	5'W C A T A T C W-3'	PyPyHpPyHpPy-γ-ImPyHpPyHpIm
2789)	5'W C A T A A T W-3'	PyPyHpPyPyHp-γ-PyHpHpPyHpIm
2790)	5'W C A T A A A W-3'	PyPyHpPyPyPy-γ-HpHpHpPyHpIm
2791)	5'W C A T A A G W-3'	PyPyHpPyPyIm-γ-PyHpHpPyHpIm
2792)	5'W C A T A A C W-3'	PyPyHpPyPyPy-γ-ImHpHpPyHpIm
2793)	5'W C A T A G T W-3'	PyPyHpPyImHp-γ-PyPyHpPyHpIm
2794)	5'W C A T A G A W-3'	PyPyHpPyImPy-γ-HpPyHpPyHpIm
2795)	5'W C A T A G G W-3'	PyPyHpPyImIm-γ-PyPyHpPyHpIm
2796)	5'W C A T A G C W-3'	PyPyHpPyImPy-γ-ImPyHpPyHpIm
2797)	5'W C A T A C T W-3'	PyPyHpPyPyHp-γ-PyImHpPyHpIm
2798)	5'W C A T A C A W-3'	PyPyHpPyPyPy-γ-HpImHpPyHpIm
2799)	5'W C A T A C G W-3'	PyPyHpPyPyIm-γ-PyImHpPyHpIm
2800)	5'W C A T A C C W-3'	PyPyHpPyPyPy-γ-ImImHpPyHpIm

TABLE 135: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCATSNNW-3'

DNA sequence	aromatic amino acid sequence
2801) 5'W C A T G T T W-3'	PyPyHpImHpHp-γ-PyPyPyPyHpIm
2802) 5'W C A T G T A W-3'	PyPyHpImHpPy-γ-HpPyPyPyHpIm
2803) 5'W C A T G T G W-3'	PyPyHpImHpIm-γ-PyPyPyPyHpIm
2804) 5'W C A T G T C W-3'	PyPyHpImHpPy-γ-ImPyPyPyHpIm
2805) 5'W C A T G A T W-3'	PyPyHpImPyHp-γ-PyHpPyPyHpIm
2806) 5'W C A T G A A W-3'	PyPyHpImPyPy-γ-HpHpPyPyHpIm
2807) 5'W C A T G A G W-3'	PyPyHpImPyIm-γ-PyHpPyPyHpIm
2808) 5'W C A T G A C W-3'	PyPyHpImPyPy-γ-ImHpPyPyHpIm
2809) 5'W C A T G G T W-3'	PyPyHpImImHp-γ-PyPyPyPyHpIm
2810) 5'W C A T G G A W-3'	PyPyHpImImPy-γ-HpPyPyPyHpIm
2811) 5'W C A T G C T W-3'	PyPyHpImPyHp-γ-PyImPyPyHpIm
2812) 5'W C A T G C A W-3'	PyPyHpImPyPy-γ-HpImPyPyHpIm
2813) 5'W C A T G G G W-3'	PyPyHpImImIm-γ-PyPyPyPyHpIm
2814) 5'W C A T G G C W-3'	PyPyHpImImPy-γ-ImPyPyPyHpIm
2815) 5'W C A T G C G W-3'	PyPyHpImPyIm-γ-PyImPyPyHpIm
2816) 5'W C A T G C C W-3'	PyPyHpImPyPy-γ-ImImPyPyHpIm
2817) 5'W C A T C T T W-3'	PyPyHpPyHpHp-γ-PyPyImPyHpIm
2818) 5'W C A T C T A W-3'	PyPyHpPyHpPy-γ-HpPyImPyHpIm
2819) 5'W C A T C T G W-3'	PyPyHpPyHpIm-γ-PyPyImPyHpIm
2820) 5'W C A T C T C W-3'	PyPyHpPyHpPy-γ-ImPyImPyHpIm
2821) 5'W C A T C A T W-3'	PyPyHpPyPyHp-γ-PyHpImPyHpIm
2822) 5'W C A T C A A W-3'	PyPyHpPyPyPy-γ-HpHpImPyHpIm
2823) 5'W C A T C A G W-3'	PyPyHpPyPyIm-γ-PyHpImPyHpIm
2824) 5'W C A T C A C W-3'	PyPyHpPyPyPy-γ-ImHpImPyHpIm
2825) 5'W C A T C G T W-3'	PyPyHpPyImHp-γ-PyPyImPyHpIm
2826) 5'W C A T C G A W-3'	PyPyHpPyImPy-γ-HpPyImPyHpIm
2827) 5'W C A T C C T W-3'	PyPyHpPyPyHp-γ-PyImImPyHpIm
2828) 5'W C A T C C A W-3'	PyPyHpPyPyPy-γ-HpImImPyHpIm
2829) 5'W C A T C G G W-3'	PyPyHpPyImIm-γ-PyPyImPyHpIm
2830) 5'W C A T C G C W-3'	PyPyHpPyImPy-γ-ImPyImPyHpIm
2831) 5'W C A T C C G W-3'	PyPyHpPyPyIm-γ-PyImImPyHpIm
2832) 5'W C A T C C C W-3'	PyPyHpPyPyPy-γ-ImImImPyHpIm

TABLE 136: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCAAWNNW-3'

DNA sequence	aromatic amino acid sequence
2833) 5'W C A A T T T W-3'	PyPyPyHpHpHp-γ-PyPyPyHpHpIm
2834) 5'W C A A T T A W-3'	PyPyPyHpHpPy-γ-HpPyPyHpHpIm
2835) 5'W C A A T T G W-3'	PyPyPyHpHpIm-γ-PyPyPyHpHpIm
2836) 5'W C A A T T C W-3'	PyPyPyHpHpPy-γ-ImPyPyHpHpIm
2837) 5'W C A A T A T W-3'	PyPyPyHpPyHp-γ-PyHpPyHpHpIm
2838) 5'W C A A T A A W-3'	PyPyPyHpPyPy-γ-HpHpPyHpHpIm
2839) 5'W C A A T A G W-3'	PyPyPyHpPyIm-γ-PyHpPyHpHpIm
2840) 5'W C A A T A C W-3'	PyPyPyHpPyPy-γ-ImHpPyHpHpIm
2841) 5'W C A A T G T W-3'	PyPyPyHpImHp-γ-PyPyPyHpHpIm
2842) 5'W C A A T G A W-3'	PyPyPyHpImPy-γ-HpPyPyHpHpIm
2843) 5'W C A A T G G W-3'	PyPyPyHpImIm-γ-PyPyPyHpHpIm
2844) 5'W C A A T G C W-3'	PyPyPyHpImPy-γ-ImPyPyHpHpIm
2845) 5'W C A A T C T W-3'	PyPyPyHpPyHp-γ-PyImPyHpHpIm
2846) 5'W C A A T C A W-3'	PyPyPyHpPyPy-γ-HpImPyHpHpIm
2847) 5'W C A A T C G W-3'	PyPyPyHpPyIm-γ-PyImPyHpHpIm
2848) 5'W C A A T C C W-3'	PyPyPyHpPyPy-γ-ImImPyHpHpIm
2849) 5'W C A A A T T W-3'	PyPyPyPyHpHp-γ-PyPyHpHpHpIm
2850) 5'W C A A A T A W-3'	PyPyPyPyHpPy-γ-HpPyHpHpHpIm
2851) 5'W C A A A T G W-3'	PyPyPyPyHpIm-γ-PyPyHpHpHpIm
2852) 5'W C A A A T C W-3'	PyPyPyPyHpPy-γ-ImPyHpHpHpIm
2853) 5'W C A A A A T W-3'	PyPyPyPyPyHp-γ-PyHpHpHpHpIm
2854) 5'W C A A A A A W-3'	PyPyPyPyPyPy-γ-HpHpHpHpHpIm
2855) 5'W C A A A A G W-3'	PyPyPyPyPyIm-γ-PyHpHpHpHpIm
2856) 5'W C A A A A C W-3'	PyPyPyPyPyPy-γ-ImHpHpHpHpIm
2857) 5'W C A A A G T W-3'	PyPyPyPyImHp-γ-PyPyHpHpHpIm
2858) 5'W C A A A G A W-3'	PyPyPyPyImPy-γ-HpPyHpHpHpIm
2859) 5'W C A A A G G W-3'	PyPyPyPyImIm-γ-PyPyHpHpHpIm
2860) 5'W C A A A G C W-3'	PyPyPyPyImPy-γ-ImPyHpHpHpIm
2861) 5'W C A A A C T W-3'	PyPyPyPyPyHp-γ-PyImHpHpHpIm
2862) 5'W C A A A C A W-3'	PyPyPyPyPyPy-γ-HpImHpHpHpIm
2863) 5'W C A A A C G W-3'	PyPyPyPyPyIm-γ-PyImHpHpHpIm
2864) 5'W C A A A C C W-3'	PyPyPyPyPyPy-γ-ImImHpHpHpIm

TABLE 137: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCAASNNW-3'

	DNA sequence	aromatic amino acid sequence
2865)	5'W C A A G T T W-3'	PyPyPyImHpHp-γ-PyPyPyHpHpIm
2866)	5'W C A A G T A W-3'	PyPyPyImHpPy-γ-HpPyPyHpHpIm
2867)	5'W C A A G T G W-3'	PyPyPyImHpIm-γ-PyPyPyHpHpIm
2868)	5'W C A A G T C W-3'	PyPyPyImHpPy-γ-ImPyPyHpHpIm
2869)	5'W C A A G A T W-3'	PyPyPyImPyHp-γ-PyHpPyHpHpIm
2870)	5'W C A A G A A W-3'	PyPyPyImPyPy-γ-HpHpPyHpHpIm
2871)	5'W C A A G A G W-3'	PyPyPyImPyIm-γ-PyHpPyHpHpIm
2872)	5'W C A A G A C W-3'	PyPyPyImPyPy-γ-ImHpPyHpHpIm
2873)	5'W C A A G G T W-3'	PyPyPyImImHp-γ-PyPyPyHpHpIm
2874)	5'W C A A G G A W-3'	PyPyPyImImPy-γ-HpPyPyHpHpIm
2875)	5'W C A A G C T W-3'	PyPyPyImPyHp-γ-PyImPyHpHpIm
2876)	5'W C A A G C A W-3'	PyPyPyImPyPy-γ-HpImPyHpHpIm
2877)	5'W C A A G G G W-3'	PyPyPyImImIm-γ-PyPyPyHpHpIm
2878)	5'W C A A G G C W-3'	PyPyPyImImPy-γ-ImPyPyHpHpIm
2879)	5'W C A A G C G W-3'	PyPyPyImPyIm-γ-PyImPyHpHpIm
2880)	5'W C A A G C C W-3'	PyPyPyImPyPy-γ-ImImPyHpHpIm
2881)	5'W C A A C T T W-3'	PyPyPyPyHpHp-γ-PyPyImHpHpIm
2882)	5'W C A A C T A W-3'	PyPyPyPyHpPy-γ-HpPyImHpHpIm
2883)	5'W C A A C T G W-3'	PyPyPyPyHpIm-γ-PyPyImHpHpIm
2884)	5'W C A A C T C W-3'	PyPyPyPyHpPy-γ-ImPyImHpHpIm
2885)	5'W C A A C A T W-3'	PyPyPyPyPyHp-γ-PyHpImHpHpIm
2886)	5'W C A A C A A W-3'	PyPyPyPyPyPy-γ-HpHpImHpHpIm
2887)	5'W C A A C A G W-3'	PyPyPyPyPyIm-γ-PyHpImHpHpIm
2888)	5'W C A A C A C W-3'	PyPyPyPyPyPy-γ-ImHpImHpHpIm
2889)	5'W C A A C G T W-3'	PyPyPyPyImHp-γ-PyPyImHpHpIm
2890)	5'W C A A C G A W-3'	PyPyPyPyImPy-γ-HpPyImHpHpIm
2891)	5'W C A A C C T W-3'	PyPyPyPyPyHp-γ-PyImImHpHpIm
2892)	5'W C A A C C A W-3'	PyPyPyPyPyPy-γ-HpImImHpHpIm
2893)	5'W C A A C G G W-3'	PyPyPyPyImIm-γ-PyPyImHpHpIm
2894)	5'W C A A C G C W-3'	PyPyPyPyImPy-γ-ImPyImHpHpIm
2895)	5'W C A A C C G W-3'	PyPyPyPyPyIm-γ-PyImImHpHpIm
2896)	5'W C A A C C C W-3'	PyPyPyPyPyPy-γ-ImImImHpHpIm

TABLE 138: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCACWNNW-3'

DNA sequence	aromatic amino acid sequence
2897) 5'W C A C T T T W-3'	PyPyPyHpHpHp-γ-PyPyPyImHpIm
2898) 5'W C A C T T A W-3'	PyPyPyHpHpPy-γ-HpPyPyImHpIm
2899) 5'W C A C T T G W-3'	PyPyPyHpHpIm-γ-PyPyPyImHpIm
2900) 5'W C A C T T C W-3'	PyPyPyHpHpPy-γ-ImPyPyImHpIm
2901) 5'W C A C T A T W-3'	PyPyPyHpPyHp-γ-PyHpPyImHpIm
2902) 5'W C A C T A A W-3'	PyPyPyHpPyPy-γ-HpHpPyImHpIm
2903) 5'W C A C T A G W-3'	PyPyPyHpPyIm-γ-PyHpPyImHpIm
2904) 5'W C A C T A C W-3'	PyPyPyHpPyPy-γ-ImHpPyImHpIm
2905) 5'W C A C T G T W-3'	PyPyPyHpImHp-γ-PyPyPyImHpIm
2906) 5'W C A C T G A W-3'	PyPyPyHpImPy-γ-HpPyPyImHpIm
2907) 5'W C A C T G G W-3'	PyPyPyHpImIm-γ-PyPyPyImHpIm
2908) 5'W C A C T G C W-3'	PyPyPyHpImPy-γ-ImPyPyImHpIm
2909) 5'W C A C T C T W-3'	PyPyPyHpPyHp-γ-PyImPyImHpIm
2910) 5'W C A C T C A W-3'	PyPyPyHpPyPy-γ-HpImPyImHpIm
2911) 5'W C A C T C G W-3'	PyPyPyHpPyIm-γ-PyImPyImHpIm
2912) 5'W C A C T C C W-3'	PyPyPyHpPyPy-γ-ImImPyImHpIm
2913) 5'W C A C A T T W-3'	PyPyPyPyHpHp-γ-PyPyHpImHpIm
2914) 5'W C A C A T A W-3'	PyPyPyPyHpPy-γ-HpPyHpImHpIm
2915) 5'W C A C A T G W-3'	PyPyPyPyHpIm-γ-PyPyHpImHpIm
2916) 5'W C A C A T C W-3'	PyPyPyPyHpPy-γ-ImPyHpImHpIm
2917) 5'W C A C A A T W-3'	PyPyPyPyPyHp-γ-PyHpHpImHpIm
2918) 5'W C A C A A A W-3'	PyPyPyPyPyPy-γ-HpHpHpImHpIm
2919) 5'W C A C A A G W-3'	PyPyPyPyPyIm-γ-PyHpHpImHpIm
2920) 5'W C A C A A C W-3'	PyPyPyPyPyPy-γ-ImHpHpImHpIm
2921) 5'W C A C A G T W-3'	PyPyPyPyImHp-γ-PyPyHpImHpIm
2922) 5'W C A C A G A W-3'	PyPyPyPyImPy-γ-HpPyHpImHpIm
2923) 5'W C A C A G G W-3'	PyPyPyPyImIm-γ-PyPyHpImHpIm
2924) 5'W C A C A G C W-3'	PyPyPyPyImPy-γ-ImPyHpImHpIm
2925) 5'W C A C A C T W-3'	PyPyPyPyPyHp-γ-PyImHpImHpIm
2926) 5'W C A C A C A W-3'	PyPyPyPyPyPy-γ-HpImHpImHpIm
2927) 5'W C A C A C G W-3'	PyPyPyPyPyIm-γ-PyImHpImHpIm
2928) 5'W C A C A C C W-3'	PyPyPyPyPyPy-γ-ImImHpImHpIm

TABLE 139: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCACSNNW-3'

DNA sequence	aromatic amino acid sequence
2929) 5'W C A C G T T W-3'	PyPyPyImHpHp-γ-PyPyPyImHpIm
2930) 5'W C A C G T A W-3'	PyPyPyImHpPy-γ-HpPyPyImHpIm
2931) 5'W C A C G T G W-3'	PyPyPyImHpIm-γ-PyPyPyImHpIm
2932) 5'W C A C G T C W-3'	PyPyPyImHpPy-γ-ImPyPyImHpIm
2933) 5'W C A C G A T W-3'	PyPyPyImPyHp-γ-PyHpPyImHpIm
2934) 5'W C A C G A A W-3'	PyPyPyImPyPy-γ-HpHpPyImHpIm
2935) 5'W C A C G A G W-3'	PyPyPyImPyIm-γ-PyHpPyImHpIm
2936) 5'W C A C G A C W-3'	PyPyPyImPyPy-γ-ImHpPyImHpIm
2937) 5'W C A C G G T W-3'	PyPyPyImImHp-γ-PyPyPyImHpIm
2938) 5'W C A C G G A W-3'	PyPyPyImImPy-γ-HpPyPyImHpIm
2939) 5'W C A C G C T W-3'	PyPyPyImPyHp-γ-PyImPyImHpIm
2940) 5'W C A C G C A W-3'	PyPyPyImPyPy-γ-HpImPyImHpIm
2941) 5'W C A C C T T W-3'	PyPyPyPyHpHp-γ-PyPyImImHpIm
2942) 5'W C A C C T A W-3'	PyPyPyPyHpPy-γ-HpPyImImHpIm
2943) 5'W C A C C T G W-3'	PyPyPyPyHpIm-γ-PyPyImImHpIm
2944) 5'W C A C C T C W-3'	PyPyPyPyHpPy-γ-ImPyImImHpIm
2945) 5'W C A C C A T W-3'	PyPyPyPyPyHp-γ-PyHpImImHpIm
2946) 5'W C A C C A A W-3'	PyPyPyPyPyPy-γ-HpHpImImHpIm
2947) 5'W C A C C A G W-3'	PyPyPyPyPyIm-γ-PyHpImImHpIm
2948) 5'W C A C C A C W-3'	PyPyPyPyPyPy-γ-ImHpImImHpIm
2949) 5'W C A C C G T W-3'	PyPyPyPyImHp-γ-PyPyImImHpIm
2950) 5'W C A C C G A W-3'	PyPyPyPyImPy-γ-HpPyImImHpIm
2951) 5'W C A C C C T W-3'	PyPyPyPyPyHp-γ-PyImImImHpIm
2952) 5'W C A C C C A W-3'	PyPyPyPyPyPy-γ-HpImImImHpIm
2953) 5'W C A C G G G W-3'	PyPyPyImImIm-γ-PyPyPyImHpIm
2954) 5'W C A C G G C W-3'	PyPyPyImImPy-γ-ImPyPyImHpIm
2955) 5'W C A C G C G W-3'	PyPyPyImPyIm-γ-PyImPyImHpIm
2956) 5'W C A C G C C W-3'	PyPyPyImPyPy-γ-ImImPyImHpIm
2957) 5'W C A C C G G W-3'	PyPyPyPyImIm-γ-PyPyImImHpIm
2958) 5'W C A C C G C W-3'	PyPyPyPyImPy-γ-ImPyImImHpIm
2959) 5'W C A C C C G W-3'	PyPyPyPyPyIm-γ-PyImImImHpIm
2960) 5'W C A C C C C W-3'	PyPyPyPyPyPy-γ-ImImImImHpIm

TABLE 140: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTGWNNW-3'

	DNA sequence	aromatic amino acid sequence
2961)	5'W C T G T T T W-3'	PyHpImHpHpHp-γ-PyPyPyPyPyIm
2962)	5'W C T G T T A W-3'	PyHpImHpHpPy-γ-HpPyPyPyPyIm
2963)	5'W C T G T T G W-3'	PyHpImHpHpIm-γ-PyPyPyPyPyIm
2964)	5'W C T G T T C W-3'	PyHpImHpHpPy-γ-ImPyPyPyPyIm
2965)	5'W C T G T A T W-3'	PyHpImHpPyHp-γ-PyHpPyPyPyIm
2966)	5'W C T G T A A W-3'	PyHpImHpPyPy-γ-HpHpPyPyPyIm
2967)	5'W C T G T A G W-3'	PyHpImHpPyIm-γ-PyHpPyPyPyIm
2968)	5'W C T G T A C W-3'	PyHpImHpPyPy-γ-ImHpPyPyPyIm
2969)	5'W C T G T G T W-3'	PyHpImHpImHp-γ-PyPyPyPyPyIm
2970)	5'W C T G T G A W-3'	PyHpImHpImPy-γ-HpPyPyPyPyIm
2971)	5'W C T G T G G W-3'	PyHpImHpImIm-γ-PyPyPyPyPyIm
2972)	5'W C T G T G C W-3'	PyHpImHpImPy-γ-ImPyPyPyPyIm
2973)	5'W C T G T C T W-3'	PyHpImHpPyHp-γ-PyImPyPyPyIm
2974)	5'W C T G T C A W-3'	PyHpImHpPyPy-γ-HpImPyPyPyIm
2975)	5'W C T G T C G W-3'	PyHpImHpPyIm-γ-PyImPyPyPyIm
2976)	5'W C T G T C C W-3'	PyHpImHpPyPy-γ-ImImPyPyPyIm
2977)	5'W C T G A T T W-3'	PyHpImPyHpHp-γ-PyPyHpPyPyIm
2978)	5'W C T G A T A W-3'	PyHpImPyHpPy-γ-HpPyHpPyPyIm
2979)	5'W C T G A T G W-3'	PyHpImPyHpIm-γ-PyPyHpPyPyIm
2980)	5'W C T G A T C W-3'	PyHpImPyHpPy-γ-ImPyHpPyPyIm
2981)	5'W C T G A A T W-3'	PyHpImPyPyHp-γ-PyHpHpPyPyIm
2982)	5'W C T G A A A W-3'	PyHpImPyPyPy-γ-HpHpHpPyPyIm
2983)	5'W C T G A A G W-3'	PyHpImPyPyIm-γ-PyHpHpPyPyIm
2984)	5'W C T G A A C W-3'	PyHpImPyPyPy-γ-ImHpHpPyPyIm
2985)	5'W C T G A G T W-3'	PyHpImPyImHp-γ-PyPyHpPyPyIm
2986)	5'W C T G A G A W-3'	PyHpImPyImPy-γ-HpPyHpPyPyIm
2987)	5'W C T G A G G W-3'	PyHpImPyImIm-γ-PyPyHpPyPyIm
2988)	5'W C T G A G C W-3'	PyHpImPyImPy-γ-ImPyHpPyPyIm
2989)	5'W C T G A C T W-3'	PyHpImPyPyHp-γ-PyImHpPyPyIm
2990)	5'W C T G A C A W-3'	PyHpImPyPyPy-γ-HpImHpPyPyIm
2991)	5'W C T G A C G W-3'	PyHpImPyPyIm-γ-PyImHpPyPyIm
2992)	5'W C T G A C C W-3'	PyHpImPyPyPy-γ-ImImHpPyPyIm

TABLE 141: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTGSNNW-3'

DNA sequence	aromatic amino acid sequence
2993) 5'W C T G G T T W-3'	PyHpImImHpHp-γ-PyPyPyPyPyIm
2994) 5'W C T G G T A W-3'	PyHpImImHpPy-γ-HpPyPyPyPyIm
2995) 5'W C T G G T G W-3'	PyHpImImHpIm-γ-PyPyPyPyPyIm
2996) 5'W C T G G T C W-3'	PyHpImImHpPy-γ-ImPyPyPyPyIm
2997) 5'W C T G G A T W-3'	PyHpImImPyHp-γ-PyHpPyPyPyIm
2998) 5'W C T G G A A W-3'	PyHpImImPyPy-γ-HpHpPyPyPyIm
2999) 5'W C T G G A G W-3'	PyHpImImPyIm-γ-PyHpPyPyPyIm
3000) 5'W C T G G A C W-3'	PyHpImImPyPy-γ-ImHpPyPyPyIm
3001) 5'W C T G G G T W-3'	PyHpImImImHp-γ-PyPyPyPyPyIm
3002) 5'W C T G G G A W-3'	PyHpImImImPy-γ-HpPyPyPyPyIm
3003) 5'W C T G G C T W-3'	PyHpImImPyHp-γ-PyImPyPyPyIm
3004) 5'W C T G G C A W-3'	PyHpImImPyPy-γ-HpImPyPyPyIm
3005) 5'W C T G C T T W-3'	PyHpImPyHpHp-γ-PyPyImPyPyIm
3006) 5'W C T G C T A W-3'	PyHpImPyHpPy-γ-HpPyImPyPyIm
3007) 5'W C T G C T G W-3'	PyHpImPyHpIm-γ-PyPyImPyPyIm
3008) 5'W C T G C T C W-3'	PyHpImPyHpPy-γ-ImPyImPyPyIm
3009) 5'W C T G C A T W-3'	PyHpImPyPyHp-γ-PyHpImPyPyIm
3010) 5'W C T G C A A W-3'	PyHpImPyPyPy-γ-HpHpImPyPyIm
3011) 5'W C T G C A G W-3'	PyHpImPyPyIm-γ-PyHpImPyPyIm
3012) 5'W C T G C A C W-3'	PyHpImPyPyPy-γ-ImHpImPyPyIm
3013) 5'W C T G C G T W-3'	PyHpImPyImHp-γ-PyPyImPyPyIm
3014) 5'W C T G C G A W-3'	PyHpImPyImPy-γ-HpPyImPyPyIm
3015) 5'W C T G C C T W-3'	PyHpImPyPyHp-γ-PyImImPyPyIm
3016) 5'W C T G C C A W-3'	PyHpImPyPyPy-γ-HpImImPyPyIm
3017) 5'W C T G G G G W-3'	PyHpImImImIm-γ-PyPyPyPyPyIm
3018) 5'W C T G G G C W-3'	PyHpImImImPy-γ-ImPyPyPyPyIm
3019) 5'W C T G G C G W-3'	PyHpImImPyIm-γ-PyImPyPyPyIm
3020) 5'W C T G G C C W-3'	PyHpImImPyPy-γ-ImImPyPyPyIm
3021) 5'W C T G C G G W-3'	PyHpImPyImIm-γ-PyPyImPyPyIm
3022) 5'W C T G C G C W-3'	PyHpImPyImPy-γ-ImPyImPyPyIm
3023) 5'W C T G C C G W-3'	PyHpImPyPyIm-γ-PyImImPyPyIm
3024) 5'W C T G C C C W-3'	PyHpImPyPyPy-γ-ImImImPyPyIm

TABLE 142: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTTWNNW-3'

	DNA sequence	aromatic amino acid sequence
3025)	5'W C T T T T T W-3'	PyHpHpHpHpHp-γ-PyPyPyPyPyIm
3026)	5'W C T T T T A W-3'	PyHpHpHpHpPy-γ-HpPyPyPyPyIm
3027)	5'W C T T T T G W-3'	PyHpHpHpHpIm-γ-PyPyPyPyPyIm
3028)	5'W C T T T T C W-3'	PyHpHpHpHpPy-γ-ImPyPyPyPyIm
3029)	5'W C T T T A T W-3'	PyHpHpHpPyHp-γ-PyHpPyPyPyIm
3030)	5'W C T T T A A W-3'	PyHpHpHpPyPy-γ-HpHpPyPyPyIm
3031)	5'W C T T T A G W-3'	PyHpHpHpPyIm-γ-PyHpPyPyPyIm
3032)	5'W C T T T A C W-3'	PyHpHpHpPyPy-γ-ImHpPyPyPyIm
3033)	5'W C T T T G T W-3'	PyHpHpHpImHp-γ-PyPyPyPyPyIm
3034)	5'W C T T T G A W-3'	PyHpHpHpImPy-γ-HpPyPyPyPyIm
3035)	5'W C T T T G G W-3'	PyHpHpHpImIm-γ-PyPyPyPyPyIm
3036)	5'W C T T T G C W-3'	PyHpHpHpImPy-γ-ImPyPyPyPyIm
3037)	5'W C T T T C T W-3'	PyHpHpHpPyHp-γ-PyImPyPyPyIm
3038)	5'W C T T T C A W-3'	PyHpHpHpPyPy-γ-HpImPyPyPyIm
3039)	5'W C T T T C G W-3'	PyHpHpHpPyIm-γ-PyImPyPyPyIm
3040)	5'W C T T T C C W-3'	PyHpHpHpPyPy-γ-ImImPyPyPyIm
3041)	5'W C T T A T T W-3'	PyHpHpPyHpHp-γ-PyPyHpPyPyIm
3042)	5'W C T T A T A W-3'	PyHpHpPyHpPy-γ-HpPyHpPyPyIm
3043)	5'W C T T A T G W-3'	PyHpHpPyHpIm-γ-PyPyHpPyPyIm
3044)	5'W C T T A T C W-3'	PyHpHpPyHpPy-γ-ImPyHpPyPyIm
3045)	5'W C T T A A T W-3'	PyHpHpPyPyHp-γ-PyHpHpPyPyIm
3046)	5'W C T T A A A W-3'	PyHpHpPyPyPy-γ-HpHpHpPyPyIm
3047)	5'W C T T A A G W-3'	PyHpHpPyPyIm-γ-PyHpHpPyPyIm
3048)	5'W C T T A A C W-3'	PyHpHpPyPyPy-γ-ImHpHpPyPyIm
3049)	5'W C T T A G T W-3'	PyHpHpPyImHp-γ-PyPyHpPyPyIm
3050)	5'W C T T A G A W-3'	PyHpHpPyImPy-γ-HpPyHpPyPyIm
3051)	5'W C T T A G G W-3'	PyHpHpPyImIm-γ-PyPyHpPyPyIm
3052)	5'W C T T A G C W-3'	PyHpHpPyImPy-γ-ImPyHpPyPyIm
3053)	5'W C T T A C T W-3'	PyHpHpPyPyHp-γ-PyImHpPyPyIm
3054)	5'W C T T A C A W-3'	PyHpHpPyPyPy-γ-HpImHpPyPyIm
3055)	5'W C T T A C G W-3'	PyHpHpPyPyIm-γ-PyImHpPyPyIm
3056)	5'W C T T A C C W-3'	PyHpHpPyPyPy-γ-ImImHpPyPyIm

TABLE 143: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTTSNNW-3'

DNA sequence	aromatic amino acid sequence
3057) 5'W C T T G T T W-3'	PyHpHpImHpHp-γ-PyPyPyPyPyIm
3058) 5'W C T T G T A W-3'	PyHpHpImHpPy-γ-HpPyPyPyPyIm
3059) 5'W C T T G T G W-3'	PyHpHpImHpIm-γ-PyPyPyPyPyIm
3060) 5'W C T T G T C W-3'	PyHpHpImHpPy-γ-ImPyPyPyPyIm
3061) 5'W C T T G A T W-3'	PyHpHpImPyHp-γ-PyHpPyPyPyIm
3062) 5'W C T T G A A W-3'	PyHpHpImPyPy-γ-HpHpPyPyPyIm
3063) 5'W C T T G A G W-3'	PyHpHpImPyIm-γ-PyHpPyPyPyIm
3064) 5'W C T T G A C W-3'	PyHpHpImPyPy-γ-ImHpPyPyPyIm
3065) 5'W C T T G G T W-3'	PyHpHpImImHp-γ-PyPyPyPyPyIm
3066) 5'W C T T G G A W-3'	PyHpHpImImPy-γ-HpPyPyPyPyIm
3067) 5'W C T T G C T W-3'	PyHpHpImPyHp-γ-PyImPyPyPyIm
3068) 5'W C T T G C A W-3'	PyHpHpImPyPy-γ-HpImPyPyPyIm
3069) 5'W C T T G G G W-3'	PyHpHpImImIm-γ-PyPyPyPyPyIm
3070) 5'W C T T G G C W-3'	PyHpHpImImPy-γ-ImPyPyPyPyIm
3071) 5'W C T T G C G W-3'	PyHpHpImPyIm-γ-PyImPyPyPyIm
3072) 5'W C T T G C C W-3'	PyHpHpImPyPy-γ-ImImPyPyPyIm
3073) 5'W C T T C T T W-3'	PyHpHpPyHpHp-γ-PyPyImPyPyIm
3074) 5'W C T T C T A W-3'	PyHpHpPyHpPy-γ-HpPyImPyPyIm
3075) 5'W C T T C T G W-3'	PyHpHpPyHpIm-γ-PyPyImPyPyIm
3076) 5'W C T T C T C W-3'	PyHpHpPyHpPy-γ-ImPyImPyPyIm
3077) 5'W C T T C A T W-3'	PyHpHpPyPyHp-γ-PyHpImPyPyIm
3078) 5'W C T T C A A W-3'	PyHpHpPyPyPy-γ-HpHpImPyPyIm
3079) 5'W C T T C A G W-3'	PyHpHpPyPyIm-γ-PyHpImPyPyIm
3080) 5'W C T T C A C W-3'	PyHpHpPyPyPy-γ-ImHpImPyPyIm
3081) 5'W C T T C G T W-3'	PyHpHpPyImHp-γ-PyPyImPyPyIm
3082) 5'W C T T C G A W-3'	PyHpHpPyImPy-γ-HpPyImPyPyIm
3083) 5'W C T T C C T W-3'	PyHpHpPyPyHp-γ-PyImImPyPyIm
3084) 5'W C T T C C A W-3'	PyHpHpPyPyPy-γ-HpImImPyPyIm
3085) 5'W C T T C G G W-3'	PyHpHpPyImIm-γ-PyPyImPyPyIm
3086) 5'W C T T C G C W-3'	PyHpHpPyImPy-γ-ImPyImPyPyIm
3087) 5'W C T T C C G W-3'	PyHpHpPyPyIm-γ-PyImImPyPyIm
3088) 5'W C T T C C C W-3'	PyHpHpPyPyPy-γ-ImImImPyPyIm

TABLE 144: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTAWNNW-3'

DNA sequence	aromatic amino acid sequence
3089) 5'W C T A T T T W-3'	PyHpPyHpHpHp-γ-PyPyPyHpPyIm
3090) 5'W C T A T T A W-3'	PyHpPyHpHpPy-γ-HpPyPyHpPyIm
3091) 5'W C T A T T G W-3'	PyHpPyHpHpIm-γ-PyPyPyHpPyIm
3092) 5'W C T A T T C W-3'	PyHpPyHpHpPy-γ-ImPyPyHpPyIm
3093) 5'W C T A T A T W-3'	PyHpPyHpPyHp-γ-PyHpPyHpPyIm
3094) 5'W C T A T A A W-3'	PyHpPyHpPyPy-γ-HpHpPyHpPyIm
3095) 5'W C T A T A G W-3'	PyHpPyHpPyIm-γ-PyHpPyHpPyIm
3096) 5'W C T A T A C W-3'	PyHpPyHpPyPy-γ-ImHpPyHpPyIm
3097) 5'W C T A T G T W-3'	PyHpPyHpImHp-γ-PyPyPyHpPyIm
3098) 5'W C T A T G A W-3'	PyHpPyHpImPy-γ-HpPyPyHpPyIm
3099) 5'W C T A T G G W-3'	PyHpPyHpImIm-γ-PyPyPyHpPyIm
3100) 5'W C T A T G C W-3'	PyHpPyHpImPy-γ-ImPyPyHpPyIm
3101) 5'W C T A T C T W-3'	PyHpPyHpPyHp-γ-PyImPyHpPyIm
3102) 5'W C T A T C A W-3'	PyHpPyHpPyPy-γ-HpImPyHpPyIm
3103) 5'W C T A T C G W-3'	PyHpPyHpPyIm-γ-PyImPyHpPyIm
3104) 5'W C T A T C C W-3'	PyHpPyHpPyPy-γ-ImImPyHpPyIm
3105) 5'W C T A A T T W-3'	PyHpPyPyHpHp-γ-PyPyHpHpPyIm
3106) 5'W C T A A T A W-3'	PyHpPyPyHpPy-γ-HpPyHpHpPyIm
3107) 5'W C T A A T G W-3'	PyHpPyPyHpIm-γ-PyPyHpHpPyIm
3108) 5'W C T A A T C W-3'	PyHpPyPyHpPy-γ-ImPyHpHpPyIm
3109) 5'W C T A A A T W-3'	PyHpPyPyPyHp-γ-PyHpHpHpPyIm
3110) 5'W C T A A A A W-3'	PyHpPyPyPyPy-γ-HpHpHpHpPyIm
3111) 5'W C T A A A G W-3'	PyHpPyPyPyIm-γ-PyHpHpHpPyIm
3112) 5'W C T A A A C W-3'	PyHpPyPyPyPy-γ-ImHpHpHpPyIm
3113) 5'W C T A A G T W-3'	PyHpPyPyImHp-γ-PyPyHpHpPyIm
3114) 5'W C T A A G A W-3'	PyHpPyPyImPy-γ-HpPyHpHpPyIm
3115) 5'W C T A A G G W-3'	PyHpPyPyImIm-γ-PyPyHpHpPyIm
3116) 5'W C T A A G C W-3'	PyHpPyPyImPy-γ-ImPyHpHpPyIm
3117) 5'W C T A A C T W-3'	PyHpPyPyPyHp-γ-PyImHpHpPyIm
3118) 5'W C T A A C A W-3'	PyHpPyPyPyPy-γ-HpImHpHpPyIm
3119) 5'W C T A A C G W-3'	PyHpPyPyPyIm-γ-PyImHpHpPyIm
3120) 5'W C T A A C C W-3'	PyHpPyPyPyPy-γ-ImImHpHpPyIm

TABLE 145: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTASNNW-3'

	DNA sequence	aromatic amino acid sequence
3121)	5'W C T A G T T W-3'	PyHpPyImHpHp-γ-PyPyPyHpPyIm
3122)	5'W C T A G T A W-3'	PyHpPyImHpPy-γ-HpPyPyHpPyIm
3123)	5'W C T A G T G W-3'	PyHpPyImHpIm-γ-PyPyPyHpPyIm
3124)	5'W C T A G T C W-3'	PyHpPyImHpPy-γ-ImPyPyHpPyIm
3125)	5'W C T A G A T W-3'	PyHpPyImPyHp-γ-PyHpPyHpPyIm
3126)	5'W C T A G A A W-3'	PyHpPyImPyPy-γ-HpHpPyHpPyIm
3127)	5'W C T A G A G W-3'	PyHpPyImPyIm-γ-PyHpPyHpPyIm
3128)	5'W C T A G A C W-3'	PyHpPyImPyPy-γ-ImHpPyHpPyIm
3129)	5'W C T A G G T W-3'	PyHpPyImImHp-γ-PyPyPyHpPyIm
3130)	5'W C T A G G A W-3'	PyHpPyImImPy-γ-HpPyPyHpPyIm
3131)	5'W C T A G C T W-3'	PyHpPyImPyHp-γ-PyImPyHpPyIm
3132)	5'W C T A G C A W-3'	PyHpPyImPyPy-γ-HpImPyHpPyIm
3133)	5'W C T A G G G W-3'	PyHpPyImImIm-γ-PyPyPyHpPyIm
3134)	5'W C T A G G C W-3'	PyHpPyImImPy-γ-ImPyPyHpPyIm
3135)	5'W C T A G C G W-3'	PyHpPyImPyIm-γ-PyImPyHpPyIm
3136)	5'W C T A G C C W-3'	PyHpPyImPyPy-γ-ImImPyHpPyIm
3137)	5'W C T A C T T W-3'	PyHpPyPyHpHp-γ-PyPyImHpPyIm
3138)	5'W C T A C T A W-3'	PyHpPyPyHpPy-γ-HpPyImHpPyIm
3139)	5'W C T A C T G W-3'	PyHpPyPyHpIm-γ-PyPyImHpPyIm
3140)	5'W C T A C T C W-3'	PyHpPyPyHpPy-γ-ImPyImHpPyIm
3141)	5'W C T A C A T W-3'	PyHpPyPyPyHp-γ-PyHpImHpPyIm
3142)	5'W C T A C A A W-3'	PyHpPyPyPyPy-γ-HpHpImHpPyIm
3143)	5'W C T A C A G W-3'	PyHpPyPyPyIm-γ-PyHpImHpPyIm
3144)	5'W C T A C A C W-3'	PyHpPyPyPyPy-γ-ImHpImHpPyIm
3145)	5'W C T A C G T W-3'	PyHpPyPyImHp-γ-PyPyImHpPyIm
3146)	5'W C T A C G A W-3'	PyHpPyPyImPy-γ-HpPyImHpPyIm
3147)	5'W C T A C C T W-3'	PyHpPyPyPyHp-γ-PyImImHpPyIm
3148)	5'W C T A C C A W-3'	PyHpPyPyPyPy-γ-HpImImHpPyIm
3149)	5'W C T A C G G W-3'	PyHpPyPyImIm-γ-PyPyImHpPyIm
3150)	5'W C T A C G C W-3'	PyHpPyPyImPy-γ-ImPyImHpPyIm
3151)	5'W C T A C C G W-3'	PyHpPyPyPyIm-γ-PyImImHpPyIm
3152)	5'W C T A C C C W-3'	PyHpPyPyPyPy-γ-ImImImHpPyIm

TABLE 146: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTCWNNW-3'

	DNA sequence	aromatic amino acid sequence
3153)	5'W C T C T T T W-3'	PyHpPyHpHpHp-γ-PyPyPyImPyIm
3154)	5'W C T C T T A W-3'	PyHpPyHpHpPy-γ-HpPyPyImPyIm
3155)	5'W C T C T T G W-3'	PyHpPyHpHpIm-γ-PyPyPyImPyIm
3156)	5'W C T C T T C W-3'	PyHpPyHpHpPy-γ-ImPyPyImPyIm
3157)	5'W C T C T A T W-3'	PyHpPyHpPyHp-γ-PyHpPyImPyIm
3158)	5'W C T C T A A W-3'	PyHpPyHpPyPy-γ-HpHpPyImPyIm
3159)	5'W C T C T A G W-3'	PyHpPyHpPyIm-γ-PyHpPyImPyIm
3160)	5'W C T C T A C W-3'	PyHpPyHpPyPy-γ-ImHpPyImPyIm
3161)	5'W C T C T G T W-3'	PyHpPyHpImHp-γ-PyPyPyImPyIm
3162)	5'W C T C T G A W-3'	PyHpPyHpImPy-γ-HpPyPyImPyIm
3163)	5'W C T C T G G W-3'	PyHpPyHpImIm-γ-PyPyPyImPyIm
3164)	5'W C T C T G C W-3'	PyHpPyHpImPy-γ-ImPyPyImPyIm
3165)	5'W C T C T C T W-3'	PyHpPyHpPyHp-γ-PyImPyImPyIm
3166)	5'W C T C T C A W-3'	PyHpPyHpPyPy-γ-HpImPyImPyIm
3167)	5'W C T C T C G W-3'	PyHpPyHpPyIm-γ-PyImPyImPyIm
3168)	5'W C T C T C C W-3'	PyHpPyHpPyPy-γ-ImImPyImPyIm
3169)	5'W C T C A T T W-3'	PyHpPyPyHpHp-γ-PyPyHpImPyIm
3170)	5'W C T C A T A W-3'	PyHpPyPyHpPy-γ-HpPyHpImPyIm
3171)	5'W C T C A T G W-3'	PyHpPyPyHpIm-γ-PyPyHpImPyIm
3172)	5'W C T C A T C W-3'	PyHpPyPyHpPy-γ-ImPyHpImPyIm
3173)	5'W C T C A A T W-3'	PyHpPyPyPyHp-γ-PyHpHpImPyIm
3174)	5'W C T C A A A W-3'	PyHpPyPyPyPy-γ-HpHpHpImPyIm
3175)	5'W C T C A A G W-3'	PyHpPyPyPyIm-γ-PyHpHpImPyIm
3176)	5'W C T C A A C W-3'	PyHpPyPyPyPy-γ-ImHpHpImPyIm
3177)	5'W C T C A G T W-3'	PyHpPyPyImHp-γ-PyPyHpImPyIm
3178)	5'W C T C A G A W-3'	PyHpPyPyImPy-γ-HpPyHpImPyIm
3179)	5'W C T C A G G W-3'	PyHpPyPyImIm-γ-PyPyHpImPyIm
3180)	5'W C T C A G C W-3'	PyHpPyPyImPy-γ-ImPyHpImPyIm
3181)	5'W C T C A C T W-3'	PyHpPyPyPyHp-γ-PyImHpImPyIm
3182)	5'W C T C A C A W-3'	PyHpPyPyPyPy-γ-HpImHpImPyIm
3183)	5'W C T C A C G W-3'	PyHpPyPyPyIm-γ-PyImHpImPyIm
3184)	5'W C T C A C C W-3'	PyHpPyPyPyPy-γ-ImImHpImPyIm

TABLE 147: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTCSNNW-3'

DNA sequence	aromatic amino acid sequence
3185) 5'W C T C G T T W-3'	PyHpPyImHpHp-γ-PyPyPyImPyIm
3186) 5'W C T C G T A W-3'	PyHpPyImHpPy-γ-HpPyPyImPyIm
3187) 5'W C T C G T G W-3'	PyHpPyImHpIm-γ-PyPyPyImPyIm
3188) 5'W C T C G T C W-3'	PyHpPyImHpPy-γ-ImPyPyImPyIm
3189) 5'W C T C G A T W-3'	PyHpPyImPyHp-γ-PyHpPyImPyIm
3190) 5'W C T C G A A W-3'	PyHpPyImPyPy-γ-HpHpPyImPyIm
3191) 5'W C T C G A G W-3'	PyHpPyImPyIm-γ-PyHpPyImPyIm
3192) 5'W C T C G A C W-3'	PyHpPyImPyPy-γ-ImHpPyImPyIm
3193) 5'W C T C G G T W-3'	PyHpPyImImHp-γ-PyPyPyImPyIm
3194) 5'W C T C G G A W-3'	PyHpPyImImPy-γ-HpPyPyImPyIm
3195) 5'W C T C G C T W-3'	PyHpPyImPyHp-γ-PyImPyImPyIm
3196) 5'W C T C G C A W-3'	PyHpPyImPyPy-γ-HpImPyImPyIm
3197) 5'W C T C C T T W-3'	PyHpPyPyHpHp-γ-PyPyImImPyIm
3198) 5'W C T C C T A W-3'	PyHpPyPyHpPy-γ-HpPyImImPyIm
3199) 5'W C T C C T G W-3'	PyHpPyPyHpIm-γ-PyPyImImPyIm
3200) 5'W C T C C T C W-3'	PyHpPyPyHpPy-γ-ImPyImImPyIm
3201) 5'W C T C C A T W-3'	PyHpPyPyPyHp-γ-PyHpImImPyIm
3202) 5'W C T C C A A W-3'	PyHpPyPyPyPy-γ-HpHpImImPyIm
3203) 5'W C T C C A G W-3'	PyHpPyPyPyIm-γ-PyHpImImPyIm
3204) 5'W C T C C A C W-3'	PyHpPyPyPyPy-γ-ImHpImImPyIm
3205) 5'W C T C C G T W-3'	PyHpPyPyImHp-γ-PyPyImImPyIm
3206) 5'W C T C C G A W-3'	PyHpPyPyImPy-γ-HpPyImImPyIm
3207) 5'W C T C C C T W-3'	PyHpPyPyPyHp-γ-PyImImImPyIm
3208) 5'W C T C C C A W-3'	PyHpPyPyPyPy-γ-HpImImImPyIm
3209) 5'W C T C G G G W-3'	PyHpPyImImIm-γ-PyPyPyImPyIm
3210) 5'W C T C G G C W-3'	PyHpPyImImPy-γ-ImPyPyImPyIm
3211) 5'W C T C G C G W-3'	PyHpPyImPyIm-γ-PyImPyImPyIm
3212) 5'W C T C G C C W-3'	PyHpPyImPyPy-γ-ImImPyImPyIm
3213) 5'W C T C C G G W-3'	PyHpPyPyImIm-γ-PyPyImImPyIm
3214) 5'W C T C C G C W-3'	PyHpPyPyImPy-γ-ImPyImImPyIm
3215) 5'W C T C C C G W-3'	PyHpPyPyPyIm-γ-PyImImImPyIm
3216) 5'W C T C C C C W-3'	PyHpPyPyPyPy-γ-ImImImImPyIm

TABLE 148: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGGGWNNW-3'

DNA sequence	aromatic amino acid sequence
1233β) 5'-W G G G T T T W-3'	ImImIm-β-HpHp-γ-PyPy-β-PyPyPy
1234β) 5'-W G G G T T A W-3'	ImImIm-β-HpPy-γ-HpPy-β-PyPyPy
1235β) 5'-W G G G T T G W-3'	ImImIm-β-HpIm-γ-PyPy-β-PyPyPy
1236β) 5'-W G G G T T C W-3'	ImImIm-β-HpPy-γ-ImPy-β-PyPyPy
1237β) 5'-W G G G T A T W-3'	ImImIm-β-PyHp-γ-PyHp-β-PyPyPy
1238β) 5'-W G G G T A A W-3'	ImImIm-β-PyPy-γ-HpHp-β-PyPyPy
1239β) 5'-W G G G T A G W-3'	ImImIm-β-PyIm-γ-PyHp-β-PyPyPy
1240β) 5'-W G G G T A C W-3'	ImImIm-β-PyPy-γ-ImHp-β-PyPyPy
1241β) 5'-W G G G T G T W-3'	ImImIm-β-ImHp-γ-PyPy-β-PyPyPy
1242β) 5'-W G G G T G A W-3'	ImImIm-β-ImPy-γ-HpPy-β-PyPyPy
1243β) 5'-W G G G T G G W-3'	ImImIm-β-ImIm-γ-PyPy-β-PyPyPy
1244β) 5'-W G G G T G C W-3'	ImImIm-β-ImPy-γ-ImPy-β-PyPyPy
1245β) 5'-W G G G T C T W-3'	ImImIm-β-PyHp-γ-PyIm-β-PyPyPy
1246β) 5'-W G G G T C A W-3'	ImImIm-β-PyPy-γ-HpIm-β-PyPyPy
1247β) 5'-W G G G T C G W-3'	ImImIm-β-PyIm-γ-PyIm-β-PyPyPy
1248β) 5'-W G G G T C C W-3'	ImImIm-β-PyPy-γ-ImIm-β-PyPyPy
1249β) 5'-W G G G A T T W-3'	ImImIm-β-HpHp-γ-PyPy-β-PyPyPy
1250β) 5'-W G G G A T A W-3'	ImImIm-β-HpPy-γ-HpPy-β-PyPyPy
1251β) 5'-W G G G A T G W-3'	ImImIm-β-HpIm-γ-PyPy-β-PyPyPy
1252β) 5'-W G G G A T C W-3'	ImImIm-β-HpPy-γ-ImPy-β-PyPyPy
1253β) 5'-W G G G A A T W-3'	ImImIm-β-PyHp-γ-PyHp-β-PyPyPy
1254β) 5'-W G G G A A A W-3'	ImImIm-β-PyPy-γ-HpHp-β-PyPyPy
1255β) 5'-W G G G A A G W-3'	ImImIm-β-PyIm-γ-PyHp-β-PyPyPy
1256β) 5'-W G G G A A C W-3'	ImImIm-β-PyPy-γ-ImHp-β-PyPyPy
1257β) 5'-W G G G A G T W-3'	ImImIm-β-ImHp-γ-PyPy-β-PyPyPy
1258β) 5'-W G G G A G A W-3'	ImImIm-β-ImPy-γ-HpPy-β-PyPyPy
1259β) 5'-W G G G A G G W-3'	ImImIm-β-ImIm-γ-PyPy-β-PyPyPy
1260β) 5'-W G G G A G C W-3'	ImImIm-β-ImPy-γ-ImPy-β-PyPyPy
1261β) 5'-W G G G A C T W-3'	ImImIm-β-PyHp-γ-PyIm-β-PyPyPy
1262β) 5'-W G G G A C A W-3'	ImImIm-β-PyPy-γ-HpIm-β-PyPyPy
1263β) 5'-W G G G A C G W-3'	ImImIm-β-PyIm-γ-PyIm-β-PyPyPy
1264β) 5'-W G G G A C C W-3'	ImImIm-β-PyPy-γ-ImIm-β-PyPyPy

TABLE 149: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGGGSNNW-3'

	DNA sequence	aromatic amino acid sequence
1265 β)	5'-W G G G G T T W-3'	ImImImIm-β-Hp-γ-Py-β-PyPyPyPy
1266 β)	5'-W G G G G T A W-3'	ImImImIm-β-Py-γ-Hp-β-PyPyPyPy
1267 β)	5'-W G G G G T G W-3'	ImImImIm-β-Im-γ-Py-β-PyPyPyPy
1268 β)	5'-W G G G G T C W-3'	ImImImIm-β-Py-γ-Im-β-PyPyPyPy
1269 β)	5'-W G G G G A T W-3'	ImImImIm-β-Hp-γ-Py-β-PyPyPyPy
1270 β)	5'-W G G G G A A W-3'	ImImImIm-β-Py-γ-Hp-β-PyPyPyPy
1271 β)	5'-W G G G G A G W-3'	ImImImIm-β-Im-γ-Py-β-PyPyPyPy
1272 β)	5'-W G G G G A C W-3'	ImImImIm-β-Py-γ-Im-β-PyPyPyPy
1275 β)	5'-W G G G G C T W-3'	ImImImIm-β-Hp-γ-PyImPy-β-PyPy
1276 β)	5'-W G G G G C A W-3'	ImImImIm-β-Py-γ-HpImPy-β-PyPy
1277 β)	5'-W G G G C T T W-3'	ImImIm-β-HpHp-γ-PyPyIm-β-PyPy
1278 β)	5'-W G G G C T A W-3'	ImImIm-β-HpPy-γ-HpPyIm-β-PyPy
1279 β)	5'-W G G G C T G W-3'	ImImIm-β-HpIm-γ-PyPyIm-β-PyPy
1280 β)	5'-W G G G C T C W-3'	ImImIm-β-HpPy-γ-ImPyIm-β-PyPy
1281 β)	5'-W G G G C A T W-3'	ImImIm-β-PyHp-γ-PyHpIm-β-PyPy
1282 β)	5'-W G G G C A A W-3'	ImImIm-β-PyPy-γ-HpHpIm-β-PyPy
1283 β)	5'-W G G G C A G W-3'	ImImIm-β-PyIm-γ-PyHpIm-β-PyPy
1284 β)	5'-W G G G C A C W-3'	ImImIm-β-PyPy-γ-ImHpIm-β-PyPy
1285 β)	5'-W G G G C G T W-3'	ImImIm-β-ImHp-γ-PyPyIm-β-PyPy
1286 β)	5'-W G G G C G A W-3'	ImImIm-β-ImPy-γ-HpPyIm-β-PyPy
1287 β)	5'-W G G G C C T W-3'	ImImIm-β-PyHp-γ-PyImIm-β-PyPy
1288 β)	5'-W G G G C C A W-3'	ImImIm-β-PyPy-γ-HpImIm-β-PyPy
G52 β)	5'-W G G G G C C W-3'	ImImImIm-β-Py-γ-ImImPy-β-PyPy
G53 β)	5'-W G G G C G G W-3'	ImImIm-β-ImIm-γ-PyPyIm-β-PyPy
G54 β)	5'-W G G G C G C W-3'	ImImIm-β-ImPy-γ-ImPyIm-β-PyPy
G55 β)	5'-W G G G C C G W-3'	ImImIm-β-PyIm-γ-PyImIm-β-PyPy
G56 β)	5'-W G G G C C C W-3'	ImImIm-β-PyPy-γ-ImImIm-β-PyPy

TABLE 150: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGGTWNNW-3'

	DNA sequence	aromatic amino acid sequence
1289β)	5'-W G G T T T T W-3'	ImIm-β-HpHpHp-γ-PyPyPy-β-PyPy
1290β)	5'-W G G T T T A W-3'	ImIm-β-HpHpPy-γ-HpPyPy-β-PyPy
1291β)	5'-W G G T T T G W-3'	ImIm-β-HpHpIm-γ-PyPyPy-β-PyPy
1292β)	5'-W G G T T T C W-3'	ImIm-β-HpHpPy-γ-ImPyPy-β-PyPy
1293β)	5'-W G G T T A T W-3'	ImIm-β-HpPyHp-γ-PyHpPy-β-PyPy
1294β)	5'-W G G T T A A W-3'	ImIm-β-HpPyPy-γ-HpHpPy-β-PyPy
1295β)	5'-W G G T T A G W-3'	ImIm-β-HpPyIm-γ-PyHpPy-β-PyPy
1296β)	5'-W G G T T A C W-3'	ImIm-β-HpPyPy-γ-ImHpPy-β-PyPy
1297β)	5'-W G G T T G T W-3'	ImIm-β-HpImHp-γ-PyPyPy-β-PyPy
1298β)	5'-W G G T T G A W-3'	ImIm-β-HpImPy-γ-HpPyPy-β-PyPy
1299β)	5'-W G G T T G G W-3'	ImIm-β-HpImIm-γ-PyPyPy-β-PyPy
1300β)	5'-W G G T T G C W-3'	ImIm-β-HpImPy-γ-ImPyPy-β-PyPy
1301β)	5'-W G G T T C T W-3'	ImIm-β-HpPyHp-γ-PyImPy-β-PyPy
1302β)	5'-W G G T T C A W-3'	ImIm-β-HpPyPy-γ-HpImPy-β-PyPy
1303β)	5'-W G G T T C G W-3'	ImIm-β-HpPyIm-γ-PyImPy-β-PyPy
1304β)	5'-W G G T T C C W-3'	ImIm-β-HpPyPy-γ-ImImPy-β-PyPy
1305β)	5'-W G G T A T T W-3'	ImIm-β-PyHpHp-γ-PyPyHp-β-PyPy
1306β)	5'-W G G T A T A W-3'	ImIm-β-PyHpPy-γ-HpPyHp-β-PyPy
1307β)	5'-W G G T A T G W-3'	ImIm-β-PyHpIm-γ-PyPyHp-β-PyPy
1308β)	5'-W G G T A T C W-3'	ImIm-β-PyHpPy-γ-ImPyHp-β-PyPy
1309β)	5'-W G G T A A T W-3'	ImIm-β-PyPyHp-γ-PyHpHp-β-PyPy
1310β)	5'-W G G T A A A W-3'	ImIm-β-PyPyPy-γ-HpHpHp-β-PyPy
1311β)	5'-W G G T A A G W-3'	ImIm-β-PyPyIm-γ-PyHpHp-β-PyPy
1312β)	5'-W G G T A A C W-3'	ImIm-β-PyPyPy-γ-ImHpHp-β-PyPy
1313β)	5'-W G G T A G T W-3'	ImIm-β-PyImHp-γ-PyPyHp-β-PyPy
1314β)	5'-W G G T A G A W-3'	ImIm-β-PyImPy-γ-HpPyHp-β-PyPy
1315β)	5'-W G G T A G G W-3'	ImIm-β-PyImIm-γ-PyPyHp-β-PyPy
1316β)	5'-W G G T A G C W-3'	ImIm-β-PyImPy-γ-ImPyHp-β-PyPy
1317β)	5'-W G G T A C T W-3'	ImIm-β-PyPyHp-γ-PyImHp-β-PyPy
1318β)	5'-W G G T A C A W-3'	ImIm-β-PyPyPy-γ-HpImHp-β-PyPy
1319β)	5'-W G G T A C G W-3'	ImIm-β-PyPyIm-γ-PyImHp-β-PyPy
1320β)	5'-W G G T A C C W-3'	ImIm-β-PyPyPy-γ-ImImHp-β-PyPy

TABLE 151: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGGTSNNW-3'

DNA sequence	aromatic amino acid sequence
1321β) 5'-W G G T G T T W-3'	ImIm-β-ImHpHp-γ-PyPyPy-β-PyPy
1322β) 5'-W G G T G T A W-3'	ImIm-β-ImHpPy-γ-HpPyPy-β-PyPy
1323β) 5'-W G G T G T G W-3'	ImIm-β-ImHpIm-γ-PyPyPy-β-PyPy
1324β) 5'-W G G T G T C W-3'	ImIm-β-ImHpPy-γ-ImPyPy-β-PyPy
1325β) 5'-W G G T G A T W-3'	ImIm-β-ImPyHp-γ-PyHpPy-β-PyPy
1326β) 5'-W G G T G A A W-3'	ImIm-β-ImPyPy-γ-HpHpPy-β-PyPy
1327β) 5'-W G G T G A G W-3'	ImIm-β-ImPyIm-γ-PyHpPy-β-PyPy
1328β) 5'-W G G T G A C W-3'	ImIm-β-ImPyPy-γ-ImHpPy-β-PyPy
1329β) 5'-W G G T G G T W-3'	ImIm-β-ImImHp-γ-PyPyPy-β-PyPy
1330β) 5'-W G G T G G A W-3'	ImIm-β-ImImPy-γ-HpPyPy-β-PyPy
1331β) 5'-W G G T G C T W-3'	ImIm-β-ImPyHp-γ-PyImPy-β-PyPy
1332β) 5'-W G G T G C A W-3'	ImIm-β-ImPyPy-γ-HpImPy-β-PyPy
1333β) 5'-W G G T G G G W-3'	ImIm-β-ImImIm-γ-PyPyPy-β-PyPy
1334β) 5'-W G G T G G C W-3'	ImIm-β-ImImPy-γ-ImPyPy-β-PyPy
1335β) 5'-W G G T G C G W-3'	ImIm-β-ImPyIm-γ-PyImPy-β-PyPy
1336β) 5'-W G G T G C C W-3'	ImIm-β-ImPyPy-γ-ImImPy-β-PyPy
1337β) 5'-W G G T C T T W-3'	ImIm-β-PyHpHp-γ-PyPyIm-β-PyPy
1338β) 5'-W G G T C T A W-3'	ImIm-β-PyHpPy-γ-HpPyIm-β-PyPy
1339β) 5'-W G G T C T G W-3'	ImIm-β-PyHpIm-γ-PyPyIm-β-PyPy
1340β) 5'-W G G T C T C W-3'	ImIm-β-PyHpPy-γ-ImPyIm-β-PyPy
1341β) 5'-W G G T C A T W-3'	ImIm-β-PyPyHp-γ-PyHpIm-β-PyPy
1342β) 5'-W G G T C A A W-3'	ImIm-β-PyPyPy-γ-HpHpIm-β-PyPy
1343β) 5'-W G G T C A G W-3'	ImIm-β-PyPyIm-γ-PyHpIm-β-PyPy
1344β) 5'-W G G T C A C W-3'	ImIm-β-PyPyPy-γ-ImHpIm-β-PyPy
1345β) 5'-W G G T C G T W-3'	ImIm-β-PyImHp-γ-PyPyIm-β-PyPy
1346β) 5'-W G G T C G A W-3'	ImIm-β-PyImPy-γ-HpPyIm-β-PyPy
1347β) 5'-W G G T C C T W-3'	ImIm-β-PyPyHp-γ-PyImIm-β-PyPy
1348β) 5'-W G G T C C A W-3'	ImIm-β-PyPyPy-γ-HpImIm-β-PyPy
1349β) 5'-W G G T C G G W-3'	ImIm-β-PyImIm-γ-PyPyIm-β-PyPy
1350β) 5'-W G G T C G C W-3'	ImIm-β-PyImPy-γ-ImPyIm-β-PyPy
1351β) 5'-W G G T C C G W-3'	ImIm-β-PyPyIm-γ-PyImIm-β-PyPy
1352β) 5'-W G G T C C C W-3'	ImIm-β-PyPyPy-γ-ImImIm-β-PyPy

TABLE 152: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGGAWNNW-3'

DNA sequence	aromatic amino acid sequence
1353β) 5'-W G G A T T T W-3'	ImIm-β-HpHpHp-γ-PyPyPy-β-PyPy
1354β) 5'-W G G A T T A W-3'	ImIm-β-HpHpPy-γ-HpPyPy-β-PyPy
1355β) 5'-W G G A T T G W-3'	ImIm-β-HpHpIm-γ-PyPyPy-β-PyPy
1356β) 5'-W G G A T T C W-3'	ImIm-β-HpHpPy-γ-ImPyPy-β-PyPy
1357β) 5'-W G G A T A T W-3'	ImIm-β-HpPyHp-γ-PyHpPy-β-PyPy
1358β) 5'-W G G A T A A W-3'	ImIm-β-HpPyPy-γ-HpHpPy-β-PyPy
1359β) 5'-W G G A T A G W-3'	ImIm-β-HpPyIm-γ-PyHpPy-β-PyPy
1360β) 5'-W G G A T A C W-3'	ImIm-β-HpPyPy-γ-ImHpPy-β-PyPy
1361β) 5'-W G G A T G T W-3'	ImIm-β-HpImHp-γ-PyPyPy-β-PyPy
1362β) 5'-W G G A T G A W-3'	ImIm-β-HpImPy-γ-HpPyPy-β-PyPy
1363β) 5'-W G G A T G G W-3'	ImIm-β-HpImIm-γ-PyPyPy-β-PyPy
1364β) 5'-W G G A T G C W-3'	ImIm-β-HpImPy-γ-ImPyPy-β-PyPy
1365β) 5'-W G G A T C T W-3'	ImIm-β-HpPyHp-γ-PyImPy-β-PyPy
1366β) 5'-W G G A T C A W-3'	ImIm-β-HpPyPy-γ-HpImPy-β-PyPy
1367β) 5'-W G G A T C G W-3'	ImIm-β-HpPyIm-γ-PyImPy-β-PyPy
1368β) 5'-W G G A T C C W-3'	ImIm-β-HpPyPy-γ-ImImPy-β-PyPy
1369β) 5'-W G G A A T T W-3'	ImIm-β-PyHpHp-γ-PyPyHp-β-PyPy
1370β) 5'-W G G A A T A W-3'	ImIm-β-PyHpPy-γ-HpPyHp-β-PyPy
1371β) 5'-W G G A A T G W-3'	ImIm-β-PyHpIm-γ-PyPyHp-β-PyPy
1372β) 5'-W G G A A T C W-3'	ImIm-β-PyHpPy-γ-ImPyHp-β-PyPy
1373β) 5'-W G G A A A T W-3'	ImIm-β-PyPyHp-γ-PyHpHp-β-PyPy
1374β) 5'-W G G A A A A W-3'	ImIm-β-PyPyPy-γ-HpHpHp-β-PyPy
1375β) 5'-W G G A A A G W-3'	ImIm-β-PyPyIm-γ-PyHpHp-β-PyPy
1376β) 5'-W G G A A A C W-3'	ImIm-β-PyPyPy-γ-ImHpHp-β-PyPy
1377β) 5'-W G G A A G T W-3'	ImIm-β-PyImHp-γ-PyPyHp-β-PyPy
1378β) 5'-W G G A A G A W-3'	ImIm-β-PyImPy-γ-HpPyHp-β-PyPy
1379β) 5'-W G G A A G G W-3'	ImIm-β-PyImIm-γ-PyPyHp-β-PyPy
1380β) 5'-W G G A A G C W-3'	ImIm-β-PyImPy-γ-ImPyHp-β-PyPy
1381β) 5'-W G G A A C T W-3'	ImIm-β-PyPyHp-γ-PyImHp-β-PyPy
1382β) 5'-W G G A A C A W-3'	ImIm-β-PyPyPy-γ-HpImHp-β-PyPy
1383β) 5'-W G G A A C G W-3'	ImIm-β-PyPyIm-γ-PyImHp-β-PyPy
1384β) 5'-W G G A A C C W-3'	ImIm-β-PyPyPy-γ-ImImHp-β-PyPy

TABLE 153: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGGASNNW-3'

	DNA sequence	aromatic amino acid sequence
1385β)	5'-W G G A G T T W-3'	ImIm-β-ImHpHp-γ-PyPyPy-β-PyPy
1386β)	5'-W G G A G T A W-3'	ImIm-β-ImHpPy-γ-HpPyPy-β-PyPy
1387β)	5'-W G G A G T G W-3'	ImIm-β-ImHpIm-γ-PyPyPy-β-PyPy
1388β)	5'-W G G A G T C W-3'	ImIm-β-ImHpPy-γ-ImPyPy-β-PyPy
1389β)	5'-W G G A G A T W-3'	ImIm-β-ImPyHp-γ-PyHpPy-β-PyPy
1390β)	5'-W G G A G A A W-3'	ImIm-β-ImPyPy-γ-HpHpPy-β-PyPy
1391β)	5'-W G G A G A G W-3'	ImIm-β-ImPyIm-γ-PyHpPy-β-PyPy
1392β)	5'-W G G A G A C W-3'	ImIm-β-ImPyPy-γ-ImHpPy-β-PyPy
1393β)	5'-W G G A G G T W-3'	ImIm-β-ImImHp-γ-PyPyPy-β-PyPy
1394β)	5'-W G G A G G A W-3'	ImIm-β-ImImPy-γ-HpPyPy-β-PyPy
1395β)	5'-W G G A G C T W-3'	ImIm-β-ImPyHp-γ-PyImPy-β-PyPy
1396β)	5'-W G G A G C A W-3'	ImIm-β-ImPyPy-γ-HpImPy-β-PyPy
1397β)	5'-W G G A G G G W-3'	ImIm-β-ImImIm-γ-PyPyPy-β-PyPy
1398β)	5'-W G G A G G C W-3'	ImIm-β-ImImPy-γ-ImPyPy-β-PyPy
1399β)	5'-W G G A G C G W-3'	ImIm-β-ImPyIm-γ-PyImPy-β-PyPy
1400β)	5'-W G G A G C C W-3'	ImIm-β-ImPyPy-γ-ImImPy-β-PyPy
1401β)	5'-W G G A C T T W-3'	ImIm-β-PyHpHp-γ-PyPyIm-β-PyPy
1402β)	5'-W G G A C T A W-3'	ImIm-β-PyHpPy-γ-HpPyIm-β-PyPy
1403β)	5'-W G G A C T G W-3'	ImIm-β-PyHpIm-γ-PyPyIm-β-PyPy
1404β)	5'-W G G A C T C W-3'	ImIm-β-PyHpPy-γ-ImPyIm-β-PyPy
1405β)	5'-W G G A C A T W-3'	ImIm-β-PyPyHp-γ-PyHpIm-β-PyPy
1406β)	5'-W G G A C A A W-3'	ImIm-β-PyPyPy-γ-HpHpIm-β-PyPy
1407β)	5'-W G G A C A G W-3'	ImIm-β-PyPyIm-γ-PyHpIm-β-PyPy
1408β)	5'-W G G A C A C W-3'	ImIm-β-PyPyPy-γ-ImHpIm-β-PyPy
1409β)	5'-W G G A C G T W-3'	ImIm-β-PyImHp-γ-PyPyIm-β-PyPy
1410β)	5'-W G G A C G A W-3'	ImIm-β-PyImPy-γ-HpPyIm-β-PyPy
1411β)	5'-W G G A C C T W-3'	ImIm-β-PyPyHp-γ-PyImIm-β-PyPy
1412β)	5'-W G G A C C A W-3'	ImIm-β-PyPyPy-γ-HpImIm-β-PyPy
1413β)	5'-W G G A C G G W-3'	ImIm-β-PyImIm-γ-PyPyIm-β-PyPy
1414β)	5'-W G G A C G C W-3'	ImIm-β-PyImPy-γ-ImPyIm-β-PyPy
1415β)	5'-W G G A C C G W-3'	ImIm-β-PyPyIm-γ-PyImIm-β-PyPy
1416β)	5'-W G G A C C C W-3'	ImIm-β-PyPyPy-γ-ImImIm-β-PyPy

TABLE 154: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGGCWNNW-3'

DNA sequence	aromatic amino acid sequence
1417β) 5'-W G G C T T T W-3'	ImImPy-β-HpHp-γ-PyPy-β-ImPyPy
1418β) 5'-W G G C T T A W-3'	ImImPy-β-HpPy-γ-HpPy-β-ImPyPy
1419β) 5'-W G G C T T G W-3'	ImImPy-β-HpIm-γ-PyPy-β-ImPyPy
1420β) 5'-W G G C T T C W-3'	ImImPy-β-HpPy-γ-ImPy-β-ImPyPy
1421β) 5'-W G G C T A T W-3'	ImImPy-β-PyHp-γ-PyHp-β-ImPyPy
1422β) 5'-W G G C T A A W-3'	ImImPy-β-PyPy-γ-HpHp-β-ImPyPy
1423β) 5'-W G G C T A G W-3'	ImImPy-β-PyIm-γ-PyHp-β-ImPyPy
1424β) 5'-W G G C T A C W-3'	ImImPy-β-PyPy-γ-ImHp-β-ImPyPy
1425β) 5'-W G G C T G T W-3'	ImImPy-β-ImHp-γ-PyPy-β-ImPyPy
1426β) 5'-W G G C T G A W-3'	ImImPy-β-ImPy-γ-HpPy-β-ImPyPy
1427β) 5'-W G G C T G G W-3'	ImImPy-β-ImIm-γ-PyPy-β-ImPyPy
1428β) 5'-W G G C T G C W-3'	ImImPy-β-ImPy-γ-ImPy-β-ImPyPy
1429β) 5'-W G G C T C T W-3'	ImImPy-β-PyHp-γ-PyIm-β-ImPyPy
1430β) 5'-W G G C T C A W-3'	ImImPy-β-PyPy-γ-HpIm-β-ImPyPy
1431β) 5'-W G G C T C G W-3'	ImImPy-β-PyIm-γ-PyIm-β-ImPyPy
1432β) 5'-W G G C T C C W-3'	ImImPy-β-PyPy-γ-ImIm-β-ImPyPy
1433β) 5'-W G G C A T T W-3'	ImImPy-β-HpHp-γ-PyPy-β-ImPyPy
1434β) 5'-W G G C A T A W-3'	ImImPy-β-HpPy-γ-HpPy-β-ImPyPy
1435β) 5'-W G G C A T G W-3'	ImImPy-β-HpIm-γ-PyPy-β-ImPyPy
1436β) 5'-W G G C A T C W-3'	ImImPy-β-HpPy-γ-ImPy-β-ImPyPy
1437β) 5'-W G G C A A T W-3'	ImImPy-β-PyHp-γ-PyHp-β-ImPyPy
1438β) 5'-W G G C A A A W-3'	ImImPy-β-PyPy-γ-HpHp-β-ImPyPy
1439β) 5'-W G G C A A G W-3'	ImImPy-β-PyIm-γ-PyHp-β-ImPyPy
1440β) 5'-W G G C A A C W-3'	ImImPy-β-PyPy-γ-ImHp-β-ImPyPy
1441β) 5'-W G G C A G T W-3'	ImImPy-β-ImHp-γ-PyPy-β-ImPyPy
1442β) 5'-W G G C A G A W-3'	ImImPy-β-ImPy-γ-HpPy-β-ImPyPy
1443β) 5'-W G G C A G G W-3'	ImImPy-β-ImIm-γ-PyPy-β-ImPyPy
1444β) 5'-W G G C A G C W-3'	ImImPy-β-ImPy-γ-ImPy-β-ImPyPy
1445β) 5'-W G G C A C T W-3'	ImImPy-β-PyHp-γ-PyIm-β-ImPyPy
1446β) 5'-W G G C A C A W-3'	ImImPy-β-PyPy-γ-HpIm-β-ImPyPy
1447β) 5'-W G G C A C G W-3'	ImImPy-β-PyIm-γ-PyIm-β-ImPyPy
1448β) 5'-W G G C A C C W-3'	ImImPy-β-PyPy-γ-ImIm-β-ImPyPy

TABLE 155: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGGCSNNW-3'

	DNA sequence	aromatic amino acid sequence
1449β)	5'-W G G C G T T W-3'	ImIm-β-ImHpHp-γ-PyPy-β-ImPyPy
1450β)	5'-W G G C G T A W-3'	ImIm-β-ImHpPy-γ-HpPy-β-ImPyPy
1451β)	5'-W G G C G T G W-3'	ImIm-β-ImHpIm-γ-PyPy-β-ImPyPy
1452β)	5'-W G G C G T C W-3'	ImIm-β-ImHpPy-γ-ImPy-β-ImPyPy
1453β)	5'-W G G C G A T W-3'	ImIm-β-ImPyHp-γ-PyHp-β-ImPyPy
1454β)	5'-W G G C G A A W-3'	ImIm-β-ImPyPy-γ-HpHp-β-ImPyPy
1455β)	5'-W G G C G A G W-3'	ImIm-β-ImPyIm-γ-PyHp-β-ImPyPy
1456β)	5'-W G G C G A C W-3'	ImIm-β-ImPyPy-γ-ImHp-β-ImPyPy
1457β)	5'-W G G C G G T W-3'	ImIm-β-ImImHp-γ-PyPy-β-ImPyPy
1458β)	5'-W G G C G G A W-3'	ImIm-β-ImImPy-γ-HpPy-β-ImPyPy
1459β)	5'-W G G C G C T W-3'	ImIm-β-ImPyHp-γ-PyIm-β-ImPyPy
1460β)	5'-W G G C G C A W-3'	ImIm-β-ImPyPy-γ-HpIm-β-ImPyPy
1461β)	5'-W G G C C T T W-3'	ImIm-β-PyHpHp-γ-Py-β-ImImPyPy
1462β)	5'-W G G C C T A W-3'	ImIm-β-PyHpPy-γ-Hp-β-ImImPyPy
1463β)	5'-W G G C C T G W-3'	ImIm-β-PyHpIm-γ-Py-β-ImImPyPy
1464β)	5'-W G G C C T C W-3'	ImIm-β-PyHpPy-γ-Im-β-ImImPyPy
1465β)	5'-W G G C C A T W-3'	ImIm-β-PyPyHp-γ-Py-β-ImImPyPy
1466β)	5'-W G G C C A A W-3'	ImIm-β-PyPyPy-γ-Hp-β-ImImPyPy
1467β)	5'-W G G C C A G W-3'	ImIm-β-PyPyIm-γ-Py-β-ImImPyPy
1468β)	5'-W G G C C A C W-3'	ImIm-β-PyPyPy-γ-Im-β-ImImPyPy
1469β)	5'-W G G C C G T W-3'	ImIm-β-PyImHp-γ-Py-β-ImImPyPy
1470β)	5'-W G G C C G A W-3'	ImIm-β-PyImPy-γ-Hp-β-ImImPyPy
1471β)	5'-W G G C C C T W-3'	ImIm-β-PyPyHp-γ-PyImImIm-β-Py
1472β)	5'-W G G C C C A W-3'	ImIm-β-PyPyPy-γ-HpImImIm-β-Py
G57β)	5'-W G G C G G G W-3'	ImIm-β-ImImIm-γ-PyPy-β-ImPyPy
G58β)	5'-W G G C G G C W-3'	ImIm-β-ImImPy-γ-ImPy-β-ImPyPy
G59β)	5'-W G G C G C G W-3'	ImIm-β-ImPyIm-γ-PyIm-β-ImPyPy
G60β)	5'-W G G C G C C W-3'	ImIm-β-ImPyPy-γ-ImIm-β-ImPyPy
G61β)	5'-W G G C C G G W-3'	ImIm-β-PyImIm-γ-Py-β-ImImPyPy
G62β)	5'-W G G C C G C W-3'	ImIm-β-PyImPy-γ-Im-β-ImImPyPy
G63β)	5'-W G G C C C G W-3'	ImIm-β-PyPyIm-γ-PyImImIm-β-Py
G64β)	5'-W G G C C C C W-3'	ImIm-β-PyPyPy-γ-ImImImIm-β-Py

TABLE 156: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGCGWNNW-3'

DNA sequence	aromatic amino acid sequence
1473β) 5'-W G C G T T T W-3'	ImPyIm-β-HpHp-γ-PyPyPy-β-ImPy
1474β) 5'-W G C G T T A W-3'	ImPyIm-β-HpPy-γ-HpPyPy-β-ImPy
1475β) 5'-W G C G T T G W-3'	ImPyIm-β-HpIm-γ-PyPyPy-β-ImPy
1476β) 5'-W G C G T T C W-3'	ImPyIm-β-HpPy-γ-ImPyPy-β-ImPy
1477β) 5'-W G C G T A T W-3'	ImPyIm-β-PyHp-γ-PyHpPy-β-ImPy
1478β) 5'-W G C G T A A W-3'	ImPyIm-β-PyPy-γ-HpHpPy-β-ImPy
1479β) 5'-W G C G T A G W-3'	ImPyIm-β-PyIm-γ-PyHpPy-β-ImPy
1480β) 5'-W G C G T A C W-3'	ImPyIm-β-PyPy-γ-ImHpPy-β-ImPy
1481β) 5'-W G C G T G T W-3'	ImPyIm-β-ImHp-γ-PyPyPy-β-ImPy
1482β) 5'-W G C G T G A W-3'	ImPyIm-β-ImPy-γ-HpPyPy-β-ImPy
1483β) 5'-W G C G T G G W-3'	ImPyIm-β-ImIm-γ-PyPyPy-β-ImPy
1484β) 5'-W G C G T G C W-3'	ImPyIm-β-ImPy-γ-ImPyPy-β-ImPy
1485β) 5'-W G C G T C T W-3'	ImPyIm-β-PyHp-γ-PyImPy-β-ImPy
1486β) 5'-W G C G T C A W-3'	ImPyIm-β-PyPy-γ-HpImPy-β-ImPy
1487β) 5'-W G C G T C G W-3'	ImPyIm-β-PyIm-γ-PyImPy-β-ImPy
1488β) 5'-W G C G T C C W-3'	ImPyIm-β-PyPy-γ-ImImPy-β-ImPy
1489β) 5'-W G C G A T T W-3'	ImPyIm-β-HpHp-γ-PyPyHp-β-ImPy
1490β) 5'-W G C G A T A W-3'	ImPyIm-β-HpPy-γ-HpPyHp-β-ImPy
1491β) 5'-W G C G A T G W-3'	ImPyIm-β-HpIm-γ-PyPyHp-β-ImPy
1492β) 5'-W G C G A T C W-3'	ImPyIm-β-HpPy-γ-ImPyHp-β-ImPy
1493β) 5'-W G C G A A T W-3'	ImPyIm-β-PyHp-γ-PyHpHp-β-ImPy
1494β) 5'-W G C G A A A W-3'	ImPyIm-β-PyPy-γ-HpHpHp-β-ImPy
1495β) 5'-W G C G A A G W-3'	ImPyIm-β-PyIm-γ-PyHpHp-β-ImPy
1496β) 5'-W G C G A A C W-3'	ImPyIm-β-PyPy-γ-ImHpHp-β-ImPy
1497β) 5'-W G C G A G T W-3'	ImPyIm-β-ImHp-γ-PyPyHp-β-ImPy
1498β) 5'-W G C G A G A W-3'	ImPyIm-β-ImPy-γ-HpPyHp-β-ImPy
1499β) 5'-W G C G A G G W-3'	ImPyIm-β-ImIm-γ-PyPyHp-β-ImPy
1490β) 5'-W G C G A G C W-3'	ImPyIm-β-ImPy-γ-ImPyHp-β-ImPy
1501β) 5'-W G C G A C T W-3'	ImPyIm-β-PyHp-γ-PyImHp-β-ImPy
1502β) 5'-W G C G A C A W-3'	ImPyIm-β-PyPy-γ-HpImHp-β-ImPy
1503β) 5'-W G C G A C G W-3'	ImPyIm-β-PyIm-γ-PyImHp-β-ImPy
1504β) 5'-W G C G A C C W-3'	ImPyIm-β-PyPy-γ-ImImHp-β-ImPy

TABLE 157: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGCGSNNW-3'

	DNA sequence	aromatic amino acid sequence
1505β)	5'-W G C G G T T W-3'	Im-β-ImImHpHp-γ-PyPyPy-β-ImPy
1506β)	5'-W G C G G T A W-3'	Im-β-ImImHpPy-γ-HpPyPy-β-ImPy
1507β)	5'-W G C G G T G W-3'	Im-β-ImImHpIm-γ-PyPyPy-β-ImPy
1508β)	5'-W G C G G T C W-3'	Im-β-ImImHpPy-γ-ImPyPy-β-ImPy
1509β)	5'-W G C G G A T W-3'	Im-β-ImImPyHp-γ-PyHpPy-β-ImPy
1510β)	5'-W G C G G A A W-3'	Im-β-ImImPyPy-γ-HpHpPy-β-ImPy
1511β)	5'-W G C G G A G W-3'	Im-β-ImImPyIm-γ-PyHpPy-β-ImPy
1512β)	5'-W G C G G A C W-3'	Im-β-ImImPyPy-γ-ImHpPy-β-ImPy
1513β)	5'-W G C G G G T W-3'	Im-β-ImImImHp-γ-PyPyPy-β-ImPy
1514β)	5'-W G C G G G A W-3'	Im-β-ImImImPy-γ-HpPyPy-β-ImPy
1515β)	5'-W G C G G C T W-3'	Im-β-ImImPyHp-γ-PyImPy-β-ImPy
1516β)	5'-W G C G G C A W-3'	Im-β-ImImPyPy-γ-HpImPy-β-ImPy
1517β)	5'-W G C G C T T W-3'	ImPyIm-β-HpHp-γ-PyPyIm-β-ImPy
1518β)	5'-W G C G C T A W-3'	ImPyIm-β-HpPy-γ-HpPyIm-β-ImPy
1519β)	5'-W G C G C T G W-3'	ImPyIm-β-HpIm-γ-PyPyIm-β-ImPy
1520β)	5'-W G C G C T C W-3'	ImPyIm-β-HpPy-γ-ImPyIm-β-ImPy
1521β)	5'-W G C G C A T W-3'	ImPyIm-β-PyHp-γ-PyHpIm-β-ImPy
1522β)	5'-W G C G C A A W-3'	ImPyIm-β-PyPy-γ-HpHpIm-β-ImPy
1523β)	5'-W G C G C A G W-3'	ImPyIm-β-PyIm-γ-PyHpIm-β-ImPy
1524β)	5'-W G C G C A C W-3'	ImPyIm-β-PyPy-γ-ImHpIm-β-ImPy
1525β)	5'-W G C G C G T W-3'	ImPyIm-β-ImHp-γ-PyPyIm-β-ImPy
1526β)	5'-W G C G C G A W-3'	ImPyIm-β-ImPy-γ-HpPyIm-β-ImPy
1527β)	5'-W G C G C C T W-3'	ImPyIm-β-PyHp-γ-PyImIm-β-ImPy
1528β)	5'-W G C G C C A W-3'	ImPyIm-β-PyPy-γ-HpImIm-β-ImPy
G65β)	5'-W G C G G G G W-3'	Im-β-ImImImIm-γ-PyPyPy-β-ImPy
G66β)	5'-W G C G G G C W-3'	Im-β-ImImImPy-γ-ImPyPy-β-ImPy
G67β)	5'-W G C G G C G W-3'	Im-β-ImImPyIm-γ-PyImPy-β-ImPy
G68β)	5'-W G C G G C C W-3'	Im-β-ImImPyPy-γ-ImImPy-β-ImPy
G69β)	5'-W G C G C G G W-3'	ImPyIm-β-ImIm-γ-PyPyIm-β-ImPy
G70β)	5'-W G C G C G C W-3'	ImPyIm-β-ImPy-γ-ImPyIm-β-ImPy
G71β)	5'-W G C G C C G W-3'	ImPyIm-β-PyIm-γ-PyImIm-β-ImPy
G72β)	5'-W G C G C C C W-3'	ImPyIm-β-PyPy-γ-ImImIm-β-ImPy

TABLE 158: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGCTWNNW-3'

	DNA sequence	aromatic amino acid sequence
1529β)	5'-W G C T T T T W-3'	ImPy-β-HpHpHp-γ-PyPyPy-β-ImPy
1530β)	5'-W G C T T T A W-3'	ImPy-β-HpHpPy-γ-HpPyPy-β-ImPy
1531β)	5'-W G C T T T G W-3'	ImPy-β-HpHpIm-γ-PyPyPy-β-ImPy
1532β)	5'-W G C T T T C W-3'	ImPy-β-HpHpPy-γ-ImPyPy-β-ImPy
1533β)	5'-W G C T T A T W-3'	ImPy-β-HpPyHp-γ-PyHpPy-β-ImPy
1534β)	5'-W G C T T A A W-3'	ImPy-β-HpPyPy-γ-HpHpPy-β-ImPy
1535β)	5'-W G C T T A G W-3'	ImPy-β-HpPyIm-γ-PyHpPy-β-ImPy
1536β)	5'-W G C T T A C W-3'	ImPy-β-HpPyPy-γ-ImHpPy-β-ImPy
1537β)	5'-W G C T T G T W-3'	ImPy-β-HpImHp-γ-PyPyPy-β-ImPy
1538β)	5'-W G C T T G A W-3'	ImPy-β-HpImPy-γ-HpPyPy-β-ImPy
1539β)	5'-W G C T T G G W-3'	ImPy-β-HpImIm-γ-PyPyPy-β-ImPy
1540β)	5'-W G C T T G C W-3'	ImPy-β-HpImPy-γ-ImPyPy-β-ImPy
1541β)	5'-W G C T T C T W-3'	ImPy-β-HpPyHp-γ-PyImPy-β-ImPy
1542β)	5'-W G C T T C A W-3'	ImPy-β-HpPyPy-γ-HpImPy-β-ImPy
1543β)	5'-W G C T T C G W-3'	ImPy-β-HpPyIm-γ-PyImPy-β-ImPy
1544β)	5'-W G C T T C C W-3'	ImPy-β-HpPyPy-γ-ImImPy-β-ImPy
1545β)	5'-W G C T A T T W-3'	ImPy-β-PyHpHp-γ-PyPyHp-β-ImPy
1546β)	5'-W G C T A T A W-3'	ImPy-β-PyHpPy-γ-HpPyHp-β-ImPy
1547β)	5'-W G C T A T G W-3'	ImPy-β-PyHpIm-γ-PyPyHp-β-ImPy
1548β)	5'-W G C T A T C W-3'	ImPy-β-PyHpPy-γ-ImPyHp-β-ImPy
1549β)	5'-W G C T A A T W-3'	ImPy-β-PyPyHp-γ-PyHpHp-β-ImPy
1550β)	5'-W G C T A A A W-3'	ImPy-β-PyPyPy-γ-HpHpHp-β-ImPy
1551β)	5'-W G C T A A G W-3'	ImPy-β-PyPyIm-γ-PyHpHp-β-ImPy
1552β)	5'-W G C T A A C W-3'	ImPy-β-PyPyPy-γ-ImHpHp-β-ImPy
1553β)	5'-W G C T A G T W-3'	ImPy-β-PyImHp-γ-PyPyHp-β-ImPy
1554β)	5'-W G C T A G A W-3'	ImPy-β-PyImPy-γ-HpPyHp-β-ImPy
1555β)	5'-W G C T A G G W-3'	ImPy-β-PyImIm-γ-PyPyHp-β-ImPy
1556β)	5'-W G C T A G C W-3'	ImPy-β-PyImPy-γ-ImPyHp-β-ImPy
1557β)	5'-W G C T A C T W-3'	ImPy-β-PyPyHp-γ-PyImHp-β-ImPy
1558β)	5'-W G C T A C A W-3'	ImPy-β-PyPyPy-γ-HpImHp-β-ImPy
1559β)	5'-W G C T A C G W-3'	ImPy-β-PyPyIm-γ-PyImHp-β-ImPy
1560β)	5'-W G C T A C C W-3'	ImPy-β-PyPyPy-γ-ImImHp-β-ImPy

TABLE 159: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGCTSNNW-3'

DNA sequence	aromatic amino acid sequence
1561β) 5'-W G C T G T T W-3'	ImPy-β-ImHpHp-γ-PyPyPy-β-ImPy
1562β) 5'-W G C T G T A W-3'	ImPy-β-ImHpPy-γ-HpPyPy-β-ImPy
1563β) 5'-W G C T G T G W-3'	ImPy-β-ImHpIm-γ-PyPyPy-β-ImPy
1564β) 5'-W G C T G T C W-3'	ImPy-β-ImHpPy-γ-ImPyPy-β-ImPy
1565β) 5'-W G C T G A T W-3'	ImPy-β-ImPyHp-γ-PyHpPy-β-ImPy
1566β) 5'-W G C T G A A W-3'	ImPy-β-ImPyPy-γ-HpHpPy-β-ImPy
1567β) 5'-W G C T G A G W-3'	ImPy-β-ImPyIm-γ-PyHpPy-β-ImPy
1568β) 5'-W G C T G A C W-3'	ImPy-β-ImPyPy-γ-ImHpPy-β-ImPy
1569β) 5'-W G C T G G T W-3'	ImPy-β-ImImHp-γ-PyPyPy-β-ImPy
1570β) 5'-W G C T G G A W-3'	ImPy-β-ImImPy-γ-HpPyPy-β-ImPy
1571β) 5'-W G C T G C T W-3'	ImPy-β-ImPyHp-γ-PyImPy-β-ImPy
1572β) 5'-W G C T G C A W-3'	ImPy-β-ImPyPy-γ-HpImPy-β-ImPy
1573β) 5'-W G C T G G G W-3'	ImPy-β-ImImIm-γ-PyPyPy-β-ImPy
1574β) 5'-W G C T G G C W-3'	ImPy-β-ImImPy-γ-ImPyPy-β-ImPy
1575β) 5'-W G C T G C G W-3'	ImPy-β-ImPyIm-γ-PyImPy-β-ImPy
1576β) 5'-W G C T G C C W-3'	ImPy-β-ImPyPy-γ-ImImPy-β-ImPy
1577β) 5'-W G C T C T T W-3'	ImPy-β-PyHpHp-γ-PyPyIm-β-ImPy
1578β) 5'-W G C T C T A W-3'	ImPy-β-PyHpPy-γ-HpPyIm-β-ImPy
1579β) 5'-W G C T C T G W-3'	ImPy-β-PyHpIm-γ-PyPyIm-β-ImPy
1580β) 5'-W G C T C T C W-3'	ImPy-β-PyHpPy-γ-ImPyIm-β-ImPy
1581β) 5'-W G C T C A T W-3'	ImPy-β-PyPyHp-γ-PyHpIm-β-ImPy
1582β) 5'-W G C T C A A W-3'	ImPy-β-PyPyPy-γ-HpHpIm-β-ImPy
1583β) 5'-W G C T C A G W-3'	ImPy-β-PyPyIm-γ-PyHpIm-β-ImPy
1584β) 5'-W G C T C A C W-3'	ImPy-β-PyPyPy-γ-ImHpIm-β-ImPy
1585β) 5'-W G C T C G T W-3'	ImPy-β-PyImHp-γ-PyPyIm-β-ImPy
1586β) 5'-W G C T C G A W-3'	ImPy-β-PyImPy-γ-HpPyIm-β-ImPy
1587β) 5'-W G C T C C T W-3'	ImPy-β-PyPyHp-γ-PyImIm-β-ImPy
1588β) 5'-W G C T C C A W-3'	ImPy-β-PyPyPy-γ-HpImIm-β-ImPy
1589β) 5'-W G C T C G G W-3'	ImPy-β-PyImIm-γ-PyPyIm-β-ImPy
1590β) 5'-W G C T C G C W-3'	ImPy-β-PyImPy-γ-ImPyIm-β-ImPy
1591β) 5'-W G C T C C G W-3'	ImPy-β-PyPyIm-γ-PyImIm-β-ImPy
1592β) 5'-W G C T C C C W-3'	ImPy-β-PyPyPy-γ-ImImIm-β-ImPy

TABLE 160: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGCAWNNW-3'

DNA sequence	aromatic amino acid sequence
1593β) 5'-W G C A T T T W-3'	ImPy-β-HpHpHp-γ-PyPyPy-β-ImPy
1594β) 5'-W G C A T T A W-3'	ImPy-β-HpHpPy-γ-HpPyPy-β-ImPy
1595β) 5'-W G C A T T G W-3'	ImPy-β-HpHpIm-γ-PyPyPy-β-ImPy
1596β) 5'-W G C A T T C W-3'	ImPy-β-HpHpPy-γ-ImPyPy-β-ImPy
1597β) 5'-W G C A T A T W-3'	ImPy-β-HpPyHp-γ-PyHpPy-β-ImPy
1598β) 5'-W G C A T A A W-3'	ImPy-β-HpPyPy-γ-HpHpPy-β-ImPy
1599β) 5'-W G C A T A G W-3'	ImPy-β-HpPyIm-γ-PyHpPy-β-ImPy
1600β) 5'-W G C A T A C W-3'	ImPy-β-HpPyPy-γ-ImHpPy-β-ImPy
1601β) 5'-W G C A T G T W-3'	ImPy-β-HpImHp-γ-PyPyPy-β-ImPy
1602β) 5'-W G C A T G A W-3'	ImPy-β-HpImPy-γ-HpPyPy-β-ImPy
1603β) 5'-W G C A T G G W-3'	ImPy-β-HpImIm-γ-PyPyPy-β-ImPy
1604β) 5'-W G C A T G C W-3'	ImPy-β-HpImPy-γ-ImPyPy-β-ImPy
1605β) 5'-W G C A T C T W-3'	ImPy-β-HpPyHp-γ-PyImPy-β-ImPy
1606β) 5'-W G C A T C A W-3'	ImPy-β-HpPyPy-γ-HpImPy-β-ImPy
1607β) 5'-W G C A T C G W-3'	ImPy-β-HpPyIm-γ-PyImPy-β-ImPy
1608β) 5'-W G C A T C C W-3'	ImPy-β-HpPyPy-γ-ImImPy-β-ImPy
1609β) 5'-W G C A A T T W-3'	ImPy-β-PyHpHp-γ-PyPyHp-β-ImPy
1610β) 5'-W G C A A T A W-3'	ImPy-β-PyHpPy-γ-HpPyHp-β-ImPy
1611β) 5'-W G C A A T G W-3'	ImPy-β-PyHpIm-γ-PyPyHp-β-ImPy
1612β) 5'-W G C A A T C W-3'	ImPy-β-PyHpPy-γ-ImPyHp-β-ImPy
1613β) 5'-W G C A A A T W-3'	ImPy-β-PyPyHp-γ-PyHpHp-β-ImPy
1614β) 5'-W G C A A A A W-3'	ImPy-β-PyPyPy-γ-HpHpHp-β-ImPy
1615β) 5'-W G C A A A G W-3'	ImPy-β-PyPyIm-γ-PyHpHp-β-ImPy
1616β) 5'-W G C A A A C W-3'	ImPy-β-PyPyPy-γ-ImHpHp-β-ImPy
1617β) 5'-W G C A A G T W-3'	ImPy-β-PyImHp-γ-PyPyHp-β-ImPy
1618β) 5'-W G C A A G A W-3'	ImPy-β-PyImPy-γ-HpPyHp-β-ImPy
1619β) 5'-W G C A A G G W-3'	ImPy-β-PyImIm-γ-PyPyHp-β-ImPy
1620β) 5'-W G C A A G C W-3'	ImPy-β-PyImPy-γ-ImPyHp-β-ImPy
1621β) 5'-W G C A A C T W-3'	ImPy-β-PyPyHp-γ-PyImHp-β-ImPy
1622β) 5'-W G C A A C A W-3'	ImPy-β-PyPyPy-γ-HpImHp-β-ImPy
1623β) 5'-W G C A A C G W-3'	ImPy-β-PyPyIm-γ-PyImHp-β-ImPy
1624β) 5'-W G C A A C C W-3'	ImPy-β-PyPyPy-γ-ImImHp-β-ImPy

TABLE 161: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGCASNNW-3'

	DNA sequence	aromatic amino acid sequence
1625β)	5'-W G C A G T T W-3'	ImPy-β-ImHpHp-γ-PyPyPy-β-ImPy
1626β)	5'-W G C A G T A W-3'	ImPy-β-ImHpPy-γ-HpPyPy-β-ImPy
1627β)	5'-W G C A G T G W-3'	ImPy-β-ImHpIm-γ-PyPyPy-β-ImPy
1628β)	5'-W G C A G T C W-3'	ImPy-β-ImHpPy-γ-ImPyPy-β-ImPy
1629β)	5'-W G C A G A T W-3'	ImPy-β-ImPyHp-γ-PyHpPy-β-ImPy
1630β)	5'-W G C A G A A W-3'	ImPy-β-ImPyPy-γ-HpHpPy-β-ImPy
1631β)	5'-W G C A G A G W-3'	ImPy-β-ImPyIm-γ-PyHpPy-β-ImPy
1632β)	5'-W G C A G A C W-3'	ImPy-β-ImPyPy-γ-ImHpPy-β-ImPy
1633β)	5'-W G C A G G T W-3'	ImPy-β-ImImHp-γ-PyPyPy-β-ImPy
1634β)	5'-W G C A G G A W-3'	ImPy-β-ImImPy-γ-HpPyPy-β-ImPy
1635β)	5'-W G C A G C T W-3'	ImPy-β-ImPyHp-γ-PyImPy-β-ImPy
1636β)	5'-W G C A G C A W-3'	ImPy-β-ImPyPy-γ-HpImPy-β-ImPy
1637β)	5'-W G C A G G G W-3'	ImPy-β-ImImIm-γ-PyPyPy-β-ImPy
1638β)	5'-W G C A G G C W-3'	ImPy-β-ImImPy-γ-ImPyPy-β-ImPy
1639β)	5'-W G C A G C G W-3'	ImPy-β-ImPyIm-γ-PyImPy-β-ImPy
1640β)	5'-W G C A G C C W-3'	ImPy-β-ImPyPy-γ-ImImPy-β-ImPy
1641β)	5'-W G C A C T T W-3'	ImPy-β-PyHpHp-γ-PyPyIm-β-ImPy
1642β)	5'-W G C A C T A W-3'	ImPy-β-PyHpPy-γ-HpPyIm-β-ImPy
1643β)	5'-W G C A C T G W-3'	ImPy-β-PyHpIm-γ-PyPyIm-β-ImPy
1644β)	5'-W G C A C T C W-3'	ImPy-β-PyHpPy-γ-ImPyIm-β-ImPy
1645β)	5'-W G C A C A T W-3'	ImPy-β-PyPyHp-γ-PyHpIm-β-ImPy
1646β)	5'-W G C A C A A W-3'	ImPy-β-PyPyPy-γ-HpHpIm-β-ImPy
1647β)	5'-W G C A C A G W-3'	ImPy-β-PyPyIm-γ-PyHpIm-β-ImPy
1648β)	5'-W G C A C A C W-3'	ImPy-β-PyPyPy-γ-ImHpIm-β-ImPy
1649β)	5'-W G C A C G T W-3'	ImPy-β-PyImHp-γ-PyPyIm-β-ImPy
1650β)	5'-W G C A C G A W-3'	ImPy-β-PyImPy-γ-HpPyIm-β-ImPy
1651β)	5'-W G C A C C T W-3'	ImPy-β-PyPyHp-γ-PyImIm-β-ImPy
1652β)	5'-W G C A C C A W-3'	ImPy-β-PyPyPy-γ-HpImIm-β-ImPy
1653β)	5'-W G C A C G G W-3'	ImPy-β-PyImIm-γ-PyPyIm-β-ImPy
1654β)	5'-W G C A C G C W-3'	ImPy-β-PyImPy-γ-ImPyIm-β-ImPy
1655β)	5'-W G C A C C G W-3'	ImPy-β-PyPyIm-γ-PyImIm-β-ImPy
1656β)	5'-W G C A C C C W-3'	ImPy-β-PyPyPy-γ-ImImIm-β-ImPy

TABLE 162: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGCCWNNW-3'

DNA sequence	aromatic amino acid sequence
1657β) 5'-W G C C T T T W-3'	ImPyPy-β-HpHp-γ-PyPy-β-ImImPy
1658β) 5'-W G C C T T A W-3'	ImPyPy-β-HpPy-γ-HpPy-β-ImImPy
1659β) 5'-W G C C T T G W-3'	ImPyPy-β-HpIm-γ-PyPy-β-ImImPy
1660β) 5'-W G C C T T C W-3'	ImPyPy-β-HpPy-γ-ImPy-β-ImImPy
1661β) 5'-W G C C T A T W-3'	ImPyPy-β-PyHp-γ-PyHp-β-ImImPy
1662β) 5'-W G C C T A A W-3'	ImPyPy-β-PyPy-γ-HpHp-β-ImImPy
1663β) 5'-W G C C T A G W-3'	ImPyPy-β-PyIm-γ-PyHp-β-ImImPy
1664β) 5'-W G C C T A C W-3'	ImPyPy-β-PyPy-γ-ImHp-β-ImImPy
1665β) 5'-W G C C T G T W-3'	ImPyPy-β-ImHp-γ-PyPy-β-ImImPy
1666β) 5'-W G C C T G A W-3'	ImPyPy-β-ImPy-γ-HpPy-β-ImImPy
1667β) 5'-W G C C T G G W-3'	ImPyPy-β-ImIm-γ-PyPy-β-ImImPy
1668β) 5'-W G C C T G C W-3'	ImPyPy-β-ImPy-γ-ImPy-β-ImImPy
1669β) 5'-W G C C T C T W-3'	ImPyPy-β-PyHp-γ-PyIm-β-ImImPy
1670β) 5'-W G C C T C A W-3'	ImPyPy-β-PyPy-γ-HpIm-β-ImImPy
1671β) 5'-W G C C T C G W-3'	ImPyPy-β-PyIm-γ-PyIm-β-ImImPy
1672β) 5'-W G C C T C C W-3'	ImPyPy-β-PyPy-γ-ImIm-β-ImImPy
1673β) 5'-W G C C A T T W-3'	ImPyPy-β-HpHp-γ-PyPy-β-ImImPy
1674β) 5'-W G C C A T A W-3'	ImPyPy-β-HpPy-γ-HpPy-β-ImImPy
1675β) 5'-W G C C A T G W-3'	ImPyPy-β-HpIm-γ-PyPy-β-ImImPy
1676β) 5'-W G C C A T C W-3'	ImPyPy-β-HpPy-γ-ImPy-β-ImImPy
1677β) 5'-W G C C A A T W-3'	ImPyPy-β-PyHp-γ-PyHp-β-ImImPy
1678β) 5'-W G C C A A A W-3'	ImPyPy-β-PyPy-γ-HpHp-β-ImImPy
1679β) 5'-W G C C A A G W-3'	ImPyPy-β-PyIm-γ-PyHp-β-ImImPy
1680β) 5'-W G C C A A C W-3'	ImPyPy-β-PyPy-γ-ImHp-β-ImImPy
1681β) 5'-W G C C A G T W-3'	ImPyPy-β-ImHp-γ-PyPy-β-ImImPy
1682β) 5'-W G C C A G A W-3'	ImPyPy-β-ImPy-γ-HpPy-β-ImImPy
1683β) 5'-W G C C A G G W-3'	ImPyPy-β-ImIm-γ-PyPy-β-ImImPy
1684β) 5'-W G C C A G C W-3'	ImPyPy-β-ImPy-γ-ImPy-β-ImImPy
1685β) 5'-W G C C A C T W-3'	ImPyPy-β-PyHp-γ-PyIm-β-ImImPy
1686β) 5'-W G C C A C A W-3'	ImPyPy-β-PyPy-γ-HpIm-β-ImImPy
1687β) 5'-W G C C A C G W-3'	ImPyPy-β-PyIm-γ-PyIm-β-ImImPy
1688β) 5'-W G C C A C C W-3'	ImPyPy-β-PyPy-γ-ImIm-β-ImImPy

TABLE 163: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGCCSNNW-3'

DNA sequence	aromatic amino acid sequence
1689β) 5'-W G C C G T T W-3'	ImPy-β-ImHpHp-γ-PyPy-β-ImImPy
1690β) 5'-W G C C G T A W-3'	ImPy-β-ImHpPy-γ-HpPy-β-ImImPy
1691β) 5'-W G C C G T G W-3'	ImPy-β-ImHpIm-γ-PyPy-β-ImImPy
1692β) 5'-W G C C G T C W-3'	ImPy-β-ImHpPy-γ-ImPy-β-ImImPy
1693β) 5'-W G C C G A T W-3'	ImPy-β-ImPyHp-γ-PyHp-β-ImImPy
1694β) 5'-W G C C G A A W-3'	ImPy-β-ImPyPy-γ-HpHp-β-ImImPy
1695β) 5'-W G C C G A G W-3'	ImPy-β-ImPyIm-γ-PyHp-β-ImImPy
1696β) 5'-W G C C G A C W-3'	ImPy-β-ImPyPy-γ-ImHp-β-ImImPy
1697β) 5'-W G C C G G T W-3'	ImPy-β-ImImHp-γ-PyPy-β-ImImPy
1698β) 5'-W G C C G G A W-3'	ImPy-β-ImImPy-γ-HpPy-β-ImImPy
1699β) 5'-W G C C G C T W-3'	ImPy-β-ImPyHp-γ-PyIm-β-ImImPy
1700β) 5'-W G C C G C A W-3'	ImPy-β-ImPyPy-γ-HpIm-β-ImImPy
1701β) 5'-W G C C C T T W-3'	ImPy-β-PyHpHp-γ-Py-β-ImImImPy
1702β) 5'-W G C C C T A W-3'	ImPy-β-PyHpPy-γ-Hp-β-ImImImPy
1703β) 5'-W G C C C T G W-3'	ImPy-β-PyHpIm-γ-Py-β-ImImImPy
1704β) 5'-W G C C C T C W-3'	ImPy-β-PyHpPy-γ-Im-β-ImImImPy
1705β) 5'-W G C C C A T W-3'	ImPy-β-PyPyHp-γ-Py-β-ImImImPy
1706β) 5'-W G C C C A A W-3'	ImPy-β-PyPyPy-γ-Hp-β-ImImImPy
1707β) 5'-W G C C C A G W-3'	ImPy-β-PyPyIm-γ-Py-β-ImImImPy
1708β) 5'-W G C C C A C W-3'	ImPy-β-PyPyPy-γ-Im-β-ImImImPy
1709β) 5'-W G C C C G T W-3'	ImPy-β-PyImHp-γ-Py-β-ImImImPy
1710β) 5'-W G C C C G A W-3'	ImPy-β-PyImPy-γ-Hp-β-ImImImPy
G73β) 5'-W G C C G G G W-3'	ImPy-β-ImImIm-γ-PyPy-β-ImImPy
G74β) 5'-W G C C G G C W-3'	ImPy-β-ImImPy-γ-ImPy-β-ImImPy
G75β) 5'-W G C C G C G W-3'	ImPy-β-ImPyIm-γ-PyIm-β-ImImPy
G76β) 5'-W G C C G C C W-3'	ImPy-β-ImPyPy-γ-ImIm-β-ImImPy
G77β) 5'-W G C C C G G W-3'	ImPy-β-PyImIm-γ-Py-β-ImImImPy
G78β) 5'-W G C C C G C W-3'	ImPy-β-PyImPy-γ-Im-β-ImImImPy

TABLE 164: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGAGWNNW-3'

DNA sequence	aromatic amino acid sequence
1713β) 5'-W G A G T T T W-3'	Im-β-ImHpHpHp-γ-PyPyPyPy-β-Py
1714β) 5'-W G A G T T A W-3'	Im-β-ImHpHpPy-γ-HpPyPyPy-β-Py
1715β) 5'-W G A G T T G W-3'	Im-β-ImHpHpIm-γ-PyPyPyPy-β-Py
1716β) 5'-W G A G T T C W-3'	Im-β-ImHpHpPy-γ-ImPyPyPy-β-Py
1717β) 5'-W G A G T A T W-3'	Im-β-ImHpPyHp-γ-PyHpPyPy-β-Py
1718β) 5'-W G A G T A A W-3'	Im-β-ImHpPyPy-γ-HpHpPyPy-β-Py
1719β) 5'-W G A G T A G W-3'	Im-β-ImHpPyIm-γ-PyHpPyPy-β-Py
1720β) 5'-W G A G T A C W-3'	Im-β-ImHpPyPy-γ-ImHpPyPy-β-Py
1721β) 5'-W G A G T G T W-3'	Im-β-ImHpImHp-γ-PyPyPyPy-β-Py
1722β) 5'-W G A G T G A W-3'	Im-β-ImHpImPy-γ-HpPyPyPy-β-Py
1723β) 5'-W G A G T G G W-3'	Im-β-ImHpImIm-γ-PyPyPyPy-β-Py
1724β) 5'-W G A G T G C W-3'	Im-β-ImHpImPy-γ-ImPyPyPy-β-Py
1725β) 5'-W G A G T C T W-3'	Im-β-ImHpPyHp-γ-PyImPyPy-β-Py
1726β) 5'-W G A G T C A W-3'	Im-β-ImHpPyPy-γ-HpImPyPy-β-Py
1727β) 5'-W G A G T C G W-3'	Im-β-ImHpPyIm-γ-PyImPyPy-β-Py
1728β) 5'-W G A G T C C W-3'	Im-β-ImHpPyPy-γ-ImImPyPy-β-Py
1729β) 5'-W G A G A T T W-3'	Im-β-ImPyHpHp-γ-PyPyHpPy-β-Py
1730β) 5'-W G A G A T A W-3'	Im-β-ImPyHpPy-γ-HpPyHpPy-β-Py
1731β) 5'-W G A G A T G W-3'	Im-β-ImPyHpIm-γ-PyPyHpPy-β-Py
1732β) 5'-W G A G A T C W-3'	Im-β-ImPyHpPy-γ-ImPyHpPy-β-Py
1733β) 5'-W G A G A A T W-3'	Im-β-ImPyPyHp-γ-PyHpHpPy-β-Py
1734β) 5'-W G A G A A A W-3'	Im-β-ImPyPyPy-γ-HpHpHpPy-β-Py
1735β) 5'-W G A G A A G W-3'	Im-β-ImPyPyIm-γ-PyHpHpPy-β-Py
1736β) 5'-W G A G A A C W-3'	Im-β-ImPyPyPy-γ-ImHpHpPy-β-Py
1737β) 5'-W G A G A G T W-3'	Im-β-ImPyImHp-γ-PyPyHpPy-β-Py
1738β) 5'-W G A G A G A W-3'	Im-β-ImPyImPy-γ-HpPyHpPy-β-Py
1739β) 5'-W G A G A G G W-3'	Im-β-ImPyImIm-γ-PyPyHpPy-β-Py
1740β) 5'-W G A G A G C W-3'	Im-β-ImPyImPy-γ-ImPyHpPy-β-Py
1741β) 5'-W G A G A C T W-3'	Im-β-ImPyPyHp-γ-PyImHpPy-β-Py
1742β) 5'-W G A G A C A W-3'	Im-β-ImPyPyPy-γ-HpImHpPy-β-Py
1743β) 5'-W G A G A C G W-3'	Im-β-ImPyPyIm-γ-PyImHpPy-β-Py
1744β) 5'-W G A G A C C W-3'	Im-β-ImPyPyPy-γ-ImImHpPy-β-Py

TABLE 165: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGAGSNNW-3'

DNA sequence	aromatic amino acid sequence
1745β) 5'-W G A G G T T W-3'	Im-β-ImImHpHp-γ-PyPyPyPy-β-Py
1746β) 5'-W G A G G T A W-3'	Im-β-ImImHpPy-γ-HpPyPyPy-β-Py
1747β) 5'-W G A G G T G W-3'	Im-β-ImImHpIm-γ-PyPyPyPy-β-Py
1748β) 5'-W G A G G T C W-3'	Im-β-ImImHpPy-γ-ImPyPyPy-β-Py
1749β) 5'-W G A G G A T W-3'	Im-β-ImImPyHp-γ-PyHpPyPy-β-Py
1750β) 5'-W G A G G A A W-3'	Im-β-ImImPyPy-γ-HpHpPyPy-β-Py
1751β) 5'-W G A G G A G W-3'	Im-β-ImImPyIm-γ-PyHpPyPy-β-Py
1752β) 5'-W G A G G A C W-3'	Im-β-ImImPyPy-γ-ImHpPyPy-β-Py
1753β) 5'-W G A G G G T W-3'	Im-β-ImImImHp-γ-PyPyPyPy-β-Py
1754β) 5'-W G A G G G A W-3'	Im-β-ImImImPy-γ-HpPyPyPy-β-Py
1755β) 5'-W G A G G C T W-3'	Im-β-ImImPyHp-γ-PyImPyPy-β-Py
1756β) 5'-W G A G G C A W-3'	Im-β-ImImPyPy-γ-HpImPyPy-β-Py
1757β) 5'-W G A G C T T W-3'	Im-β-ImPyHpHp-γ-PyPyImPy-β-Py
1758β) 5'-W G A G C T A W-3'	Im-β-ImPyHpPy-γ-HpPyImPy-β-Py
1759β) 5'-W G A G C T G W-3'	Im-β-ImPyHpIm-γ-PyPyImPy-β-Py
1760β) 5'-W G A G C T C W-3'	Im-β-ImPyHpPy-γ-ImPyImPy-β-Py
1761β) 5'-W G A G C A T W-3'	Im-β-ImPyPyHp-γ-PyHpImPy-β-Py
1762β) 5'-W G A G C A A W-3'	Im-β-ImPyPyPy-γ-HpHpImPy-β-Py
1763β) 5'-W G A G C A G W-3'	Im-β-ImPyPyIm-γ-PyHpImPy-β-Py
1764β) 5'-W G A G C A C W-3'	Im-β-ImPyPyPy-γ-ImHpImPy-β-Py
1765β) 5'-W G A G C G T W-3'	Im-β-ImPyImHp-γ-PyPyImPy-β-Py
1766β) 5'-W G A G C G A W-3'	Im-β-ImPyImPy-γ-HpPyImPy-β-Py
1767β) 5'-W G A G C C T W-3'	Im-β-ImPyPyHp-γ-PyImImPy-β-Py
1768β) 5'-W G A G C C A W-3'	Im-β-ImPyPyPy-γ-HpImImPy-β-Py
1769β) 5'-W G A G G G G W-3'	Im-β-ImImImIm-γ-PyPyPyPy-β-Py
1770β) 5'-W G A G G G C W-3'	Im-β-ImImImPy-γ-ImPyPyPy-β-Py
1771β) 5'-W G A G G C G W-3'	Im-β-ImImPyIm-γ-PyImPyPy-β-Py
1772β) 5'-W G A G G C C W-3'	Im-β-ImImPyPy-γ-ImImPyPy-β-Py
1773β) 5'-W G A G C G G W-3'	Im-β-ImPyImIm-γ-PyPyImPy-β-Py
1774β) 5'-W G A G C G C W-3'	Im-β-ImPyImPy-γ-ImPyImPy-β-Py
1775β) 5'-W G A G C C G W-3'	Im-β-ImPyPyIm-γ-PyImImPy-β-Py
1776β) 5'-W G A G C C C W-3'	Im-β-ImPyPyPy-γ-ImImImPy-β-Py

TABLE 166: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGATWNNW-3'

	DNA sequence	aromatic amino acid sequence
1777β)	5'-W G A T T T T W-3'	ImPy-β-HpHpHp-γ-PyPyPy-β-HpPy
1778β)	5'-W G A T T T A W-3'	ImPy-β-HpHpPy-γ-HpPyPy-β-HpPy
1779β)	5'-W G A T T T G W-3'	ImPy-β-HpHpIm-γ-PyPyPy-β-HpPy
1780β)	5'-W G A T T T C W-3'	ImPy-β-HpHpPy-γ-ImPyPy-β-HpPy
1781β)	5'-W G A T T A T W-3'	ImPy-β-HpPyHp-γ-PyHpPy-β-HpPy
1782β)	5'-W G A T T A A W-3'	ImPy-β-HpPyPy-γ-HpHpPy-β-HpPy
1783β)	5'-W G A T T A G W-3'	ImPy-β-HpPyIm-γ-PyHpPy-β-HpPy
1784β)	5'-W G A T T A C W-3'	ImPy-β-HpPyPy-γ-ImHpPy-β-HpPy
1785β)	5'-W G A T T G T W-3'	ImPy-β-HpImHp-γ-PyPyPy-β-HpPy
1786β)	5'-W G A T T G A W-3'	ImPy-β-HpImPy-γ-HpPyPy-β-HpPy
1787β)	5'-W G A T T G G W-3'	ImPy-β-HpImIm-γ-PyPyPy-β-HpPy
1788β)	5'-W G A T T G C W-3'	ImPy-β-HpImPy-γ-ImPyPy-β-HpPy
1789β)	5'-W G A T T C T W-3'	ImPy-β-HpPyHp-γ-PyImPy-β-HpPy
1790β)	5'-W G A T T C A W-3'	ImPy-β-HpPyPy-γ-HpImPy-β-HpPy
1791β)	5'-W G A T T C G W-3'	ImPy-β-HpPyIm-γ-PyImPy-β-HpPy
1792β)	5'-W G A T T C C W-3'	ImPy-β-HpPyPy-γ-ImImPy-β-HpPy
1793β)	5'-W G A T A T T W-3'	ImPy-β-PyHpHp-γ-PyPyHp-β-HpPy
1794β)	5'-W G A T A T A W-3'	ImPy-β-PyHpPy-γ-HpPyHp-β-HpPy
1795β)	5'-W G A T A T G W-3'	ImPy-β-PyHpIm-γ-PyPyHp-β-HpPy
1796β)	5'-W G A T A T C W-3'	ImPy-β-PyHpPy-γ-ImPyHp-β-HpPy
1797β)	5'-W G A T A A T W-3'	ImPy-β-PyPyHp-γ-PyHpHp-β-HpPy
1798β)	5'-W G A T A A A W-3'	ImPy-β-PyPyPy-γ-HpHpHp-β-HpPy
1799β)	5'-W G A T A A G W-3'	ImPy-β-PyPyIm-γ-PyHpHp-β-HpPy
1800β)	5'-W G A T A A C W-3'	ImPy-β-PyPyPy-γ-ImHpHp-β-HpPy
1801β)	5'-W G A T A G T W-3'	ImPy-β-PyImHp-γ-PyPyHp-β-HpPy
1802β)	5'-W G A T A G A W-3'	ImPy-β-PyImPy-γ-HpPyHp-β-HpPy
1803β)	5'-W G A T A G G W-3'	ImPy-β-PyImIm-γ-PyPyHp-β-HpPy
1804β)	5'-W G A T A G C W-3'	ImPy-β-PyImPy-γ-ImPyHp-β-HpPy
1805β)	5'-W G A T A C T W-3'	ImPy-β-PyPyHp-γ-PyImHp-β-HpPy
1806β)	5'-W G A T A C A W-3'	ImPy-β-PyPyPy-γ-HpImHp-β-HpPy
1807β)	5'-W G A T A C G W-3'	ImPy-β-PyPyIm-γ-PyImHp-β-HpPy
1808β)	5'-W G A T A C C W-3'	ImPy-β-PyPyPy-γ-ImImHp-β-HpPy

TABLE 167: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGATSNNW-3'

DNA sequence	aromatic amino acid sequence
1809β) 5'-W G A T G T T W-3'	ImPy-β-ImHpHp-γ-PyPyPy-β-HpPy
1810β) 5'-W G A T G T A W-3'	ImPy-β-ImHpPy-γ-HpPyPy-β-HpPy
1811β) 5'-W G A T G T G W-3'	ImPy-β-ImHpIm-γ-PyPyPy-β-HpPy
1812β) 5'-W G A T G T C W-3'	ImPy-β-ImHpPy-γ-ImPyPy-β-HpPy
1813β) 5'-W G A T G A T W-3'	ImPy-β-ImPyHp-γ-PyHpPy-β-HpPy
1814β) 5'-W G A T G A A W-3'	ImPy-β-ImPyPy-γ-HpHpPy-β-HpPy
1815β) 5'-W G A T G A G W-3'	ImPy-β-ImPyIm-γ-PyHpPy-β-HpPy
1816β) 5'-W G A T G A C W-3'	ImPy-β-ImPyPy-γ-ImHpPy-β-HpPy
1817β) 5'-W G A T G G T W-3'	ImPy-β-ImImHp-γ-PyPyPy-β-HpPy
1818β) 5'-W G A T G G A W-3'	ImPy-β-ImImPy-γ-HpPyPy-β-HpPy
1819β) 5'-W G A T G C T W-3'	ImPy-β-ImPyHp-γ-PyImPy-β-HpPy
1820β) 5'-W G A T G C A W-3'	ImPy-β-ImPyPy-γ-HpImPy-β-HpPy
1821β) 5'-W G A T G G G W-3'	ImPy-β-ImImIm-γ-PyPyPy-β-HpPy
1822β) 5'-W G A T G G C W-3'	ImPy-β-ImImPy-γ-ImPyPy-β-HpPy
1823β) 5'-W G A T G C G W-3'	ImPy-β-ImPyIm-γ-PyImPy-β-HpPy
1824β) 5'-W G A T G C C W-3'	ImPy-β-ImPyPy-γ-ImImPy-β-HpPy
1825β) 5'-W G A T C T T W-3'	ImPy-β-PyHpHp-γ-PyPyIm-β-HpPy
1826β) 5'-W G A T C T A W-3'	ImPy-β-PyHpPy-γ-HpPyIm-β-HpPy
1827β) 5'-W G A T C T G W-3'	ImPy-β-PyHpIm-γ-PyPyIm-β-HpPy
1828β) 5'-W G A T C T C W-3'	ImPy-β-PyHpPy-γ-ImPyIm-β-HpPy
1829β) 5'-W G A T C A T W-3'	ImPy-β-PyPyHp-γ-PyHpIm-β-HpPy
1830β) 5'-W G A T C A A W-3'	ImPy-β-PyPyPy-γ-HpHpIm-β-HpPy
1831β) 5'-W G A T C A G W-3'	ImPy-β-PyPyIm-γ-PyHpIm-β-HpPy
1832β) 5'-W G A T C A C W-3'	ImPy-β-PyPyPy-γ-ImHpIm-β-HpPy
1833β) 5'-W G A T C G T W-3'	ImPy-β-PyImHp-γ-PyPyIm-β-HpPy
1834β) 5'-W G A T C G A W-3'	ImPy-β-PyImPy-γ-HpPyIm-β-HpPy
1835β) 5'-W G A T C C T W-3'	ImPy-β-PyPyHp-γ-PyImIm-β-HpPy
1836β) 5'-W G A T C C A W-3'	ImPy-β-PyPyPy-γ-HpImIm-β-HpPy
1837β) 5'-W G A T C G G W-3'	ImPy-β-PyImIm-γ-PyPyIm-β-HpPy
1838β) 5'-W G A T C G C W-3'	ImPy-β-PyImPy-γ-ImPyIm-β-HpPy
1839β) 5'-W G A T C C G W-3'	ImPy-β-PyPyIm-γ-PyImIm-β-HpPy
1840β) 5'-W G A T C C C W-3'	ImPy-β-PyPyPy-γ-ImImIm-β-HpPy

TABLE 168: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGAAWNNW-3'

DNA sequence	aromatic amino acid sequence
1841β) 5'-W G A A T T T W-3'	ImPy-β-HpHpHp-γ-PyPyPy-β-HpPy
1842β) 5'-W G A A T T A W-3'	ImPy-β-HpHpPy-γ-HpPyPy-β-HpPy
1843β) 5'-W G A A T T G W-3'	ImPy-β-HpHpIm-γ-PyPyPy-β-HpPy
1844β) 5'-W G A A T T C W-3'	ImPy-β-HpHpPy-γ-ImPyPy-β-HpPy
1845β) 5'-W G A A T A T W-3'	ImPy-β-HpPyHp-γ-PyHpPy-β-HpPy
1846β) 5'-W G A A T A A W-3'	ImPy-β-HpPyPy-γ-HpHpPy-β-HpPy
1847β) 5'-W G A A T A G W-3'	ImPy-β-HpPyIm-γ-PyHpPy-β-HpPy
1848β) 5'-W G A A T A C W-3'	ImPy-β-HpPyPy-γ-ImHpPy-β-HpPy
1849β) 5'-W G A A T G T W-3'	ImPy-β-HpImHp-γ-PyPyPy-β-HpPy
1850β) 5'-W G A A T G A W-3'	ImPy-β-HpImPy-γ-HpPyPy-β-HpPy
1851β) 5'-W G A A T G G W-3'	ImPy-β-HpImIm-γ-PyPyPy-β-HpPy
1852β) 5'-W G A A T G C W-3'	ImPy-β-HpImPy-γ-ImPyPy-β-HpPy
1853β) 5'-W G A A T C T W-3'	ImPy-β-HpPyHp-γ-PyImPy-β-HpPy
1854β) 5'-W G A A T C A W-3'	ImPy-β-HpPyPy-γ-HpImPy-β-HpPy
1855β) 5'-W G A A T C G W-3'	ImPy-β-HpPyIm-γ-PyImPy-β-HpPy
1856β) 5'-W G A A T C C W-3'	ImPy-β-HpPyPy-γ-ImImPy-β-HpPy
1857β) 5'-W G A A A T T W-3'	ImPy-β-PyHpHp-γ-PyPyHp-β-HpPy
1858β) 5'-W G A A A T A W-3'	ImPy-β-PyHpPy-γ-HpPyHp-β-HpPy
1869β) 5'-W G A A A T G W-3'	ImPy-β-PyHpIm-γ-PyPyHp-β-HpPy
1860β) 5'-W G A A A T C W-3'	ImPy-β-PyHpPy-γ-ImPyHp-β-HpPy
1861β) 5'-W G A A A A T W-3'	ImPy-β-PyPyHp-γ-PyHpHp-β-HpPy
1862β) 5'-W G A A A A A W-3'	ImPy-β-PyPyPy-γ-HpHpHp-β-HpPy
1863β) 5'-W G A A A A G W-3'	ImPy-β-PyPyIm-γ-PyHpHp-β-HpPy
1864β) 5'-W G A A A A C W-3'	ImPy-β-PyPyPy-γ-ImHpHp-β-HpPy
1865β) 5'-W G A A A G T W-3'	ImPy-β-PyImHp-γ-PyPyHp-β-HpPy
1866β) 5'-W G A A A G A W-3'	ImPy-β-PyImPy-γ-HpPyHp-β-HpPy
1867β) 5'-W G A A A G G W-3'	ImPy-β-PyImIm-γ-PyPyHp-β-HpPy
1868β) 5'-W G A A A G C W-3'	ImPy-β-PyImPy-γ-ImPyHp-β-HpPy
1869β) 5'-W G A A A C T W-3'	ImPy-β-PyPyHp-γ-PyImHp-β-HpPy
1870β) 5'-W G A A A C A W-3'	ImPy-β-PyPyPy-γ-HpImHp-β-HpPy
1871β) 5'-W G A A A C G W-3'	ImPy-β-PyPyIm-γ-PyImHp-β-HpPy
1872β) 5'-W G A A A C C W-3'	ImPy-β-PyPyPy-γ-ImImHp-β-HpPy

TABLE 169: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGAASNNW-3'

	DNA sequence	aromatic amino acid sequence
1873β)	5'-W G A A G T T W-3'	ImPy-β-ImHpHp-γ-PyPyPy-β-HpPy
1874β)	5'-W G A A G T A W-3'	ImPy-β-ImHpPy-γ-HpPyPy-β-HpPy
1875β)	5'-W G A A G T G W-3'	ImPy-β-ImHpIm-γ-PyPyPy-β-HpPy
1876β)	5'-W G A A G T C W-3'	ImPy-β-ImHpPy-γ-ImPyPy-β-HpPy
1877β)	5'-W G A A G A T W-3'	ImPy-β-ImPyHp-γ-PyHpPy-β-HpPy
1878β)	5'-W G A A G A A W-3'	ImPy-β-ImPyPy-γ-HpHpPy-β-HpPy
1879β)	5'-W G A A G A G W-3'	ImPy-β-ImPyIm-γ-PyHpPy-β-HpPy
1880β)	5'-W G A A G A C W-3'	ImPy-β-ImPyPy-γ-ImHpPy-β-HpPy
1881β)	5'-W G A A G G T W-3'	ImPy-β-ImImHp-γ-PyPyPy-β-HpPy
1882β)	5'-W G A A G G A W-3'	ImPy-β-ImImPy-γ-HpPyPy-β-HpPy
1883β)	5'-W G A A G C T W-3'	ImPy-β-ImPyHp-γ-PyImPy-β-HpPy
1884β)	5'-W G A A G C A W-3'	ImPy-β-ImPyPy-γ-HpImPy-β-HpPy
1885β)	5'-W G A A G G G W-3'	ImPy-β-ImImIm-γ-PyPyPy-β-HpPy
1886β)	5'-W G A A G G C W-3'	ImPy-β-ImImPy-γ-ImPyPy-β-HpPy
1887β)	5'-W G A A G C G W-3'	ImPy-β-ImPyIm-γ-PyImPy-β-HpPy
1888β)	5'-W G A A G C C W-3'	ImPy-β-ImPyPy-γ-ImImPy-β-HpPy
1889β)	5'-W G A A C T T W-3'	ImPy-β-PyHpHp-γ-PyPyIm-β-HpPy
1890β)	5'-W G A A C T A W-3'	ImPy-β-PyHpPy-γ-HpPyIm-β-HpPy
1891β)	5'-W G A A C T G W-3'	ImPy-β-PyHpIm-γ-PyPyIm-β-HpPy
1892β)	5'-W G A A C T C W-3'	ImPy-β-PyHpPy-γ-ImPyIm-β-HpPy
1893β)	5'-W G A A C A T W-3'	ImPy-β-PyPyHp-γ-PyHpIm-β-HpPy
1894β)	5'-W G A A C A A W-3'	ImPy-β-PyPyPy-γ-HpHpIm-β-HpPy
1895β)	5'-W G A A C A G W-3'	ImPy-β-PyPyIm-γ-PyHpIm-β-HpPy
1896β)	5'-W G A A C A C W-3'	ImPy-β-PyPyPy-γ-ImHpIm-β-HpPy
1897β)	5'-W G A A C G T W-3'	ImPy-β-PyImHp-γ-PyPyIm-β-HpPy
1898β)	5'-W G A A C G A W-3'	ImPy-β-PyImPy-γ-HpPyIm-β-HpPy
1899β)	5'-W G A A C C T W-3'	ImPy-β-PyPyHp-γ-PyImIm-β-HpPy
1900β)	5'-W G A A C C A W-3'	ImPy-β-PyPyPy-γ-HpImIm-β-HpPy
1901β)	5'-W G A A C G G W-3'	ImPy-β-PyImIm-γ-PyPyIm-β-HpPy
1902β)	5'-W G A A C G C W-3'	ImPy-β-PyImPy-γ-ImPyIm-β-HpPy
1903β)	5'-W G A A C C G W-3'	ImPy-β-PyPyIm-γ-PyImIm-β-HpPy
1904β)	5'-W G A A C C C W-3'	ImPy-β-PyPyPy-γ-ImImIm-β-HpPy

TABLE 170: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGACWNNW-3'

DNA sequence	aromatic amino acid sequence
1905β) 5'-W G A C T T T W-3'	ImPyPy-β-HpHp-γ-PyPy-β-ImHpPy
1906β) 5'-W G A C T T A W-3'	ImPyPy-β-HpPy-γ-HpPy-β-ImHpPy
1907β) 5'-W G A C T T G W-3'	ImPyPy-β-HpIm-γ-PyPy-β-ImHpPy
1908β) 5'-W G A C T T C W-3'	ImPyPy-β-HpPy-γ-ImPy-β-ImHpPy
1909β) 5'-W G A C T A T W-3'	ImPyPy-β-PyHp-γ-PyHp-β-ImHpPy
1910β) 5'-W G A C T A A W-3'	ImPyPy-β-PyPy-γ-HpHp-β-ImHpPy
1911β) 5'-W G A C T A G W-3'	ImPyPy-β-PyIm-γ-PyHp-β-ImHpPy
1912β) 5'-W G A C T A C W-3'	ImPyPy-β-PyPy-γ-ImHp-β-ImHpPy
1913β) 5'-W G A C T G T W-3'	ImPyPy-β-ImHp-γ-PyPy-β-ImHpPy
1914β) 5'-W G A C T G A W-3'	ImPyPy-β-ImPy-γ-HpPy-β-ImHpPy
1915β) 5'-W G A C T G G W-3'	ImPyPy-β-ImIm-γ-PyPy-β-ImHpPy
1916β) 5'-W G A C T G C W-3'	ImPyPy-β-ImPy-γ-ImPy-β-ImHpPy
1917β) 5'-W G A C T C T W-3'	ImPyPy-β-PyHp-γ-PyIm-β-ImHpPy
1918β) 5'-W G A C T C A W-3'	ImPyPy-β-PyPy-γ-HpIm-β-ImHpPy
1919β) 5'-W G A C T C G W-3'	ImPyPy-β-PyIm-γ-PyIm-β-ImHpPy
1920β) 5'-W G A C T C C W-3'	ImPyPy-β-PyPy-γ-ImIm-β-ImHpPy
1921β) 5'-W G A C A T T W-3'	ImPyPy-β-HpHp-γ-PyPy-β-ImHpPy
1922β) 5'-W G A C A T A W-3'	ImPyPy-β-HpPy-γ-HpPy-β-ImHpPy
1923β) 5'-W G A C A T G W-3'	ImPyPy-β-HpIm-γ-PyPy-β-ImHpPy
1924β) 5'-W G A C A T C W-3'	ImPyPy-β-HpPy-γ-ImPy-β-ImHpPy
1925β) 5'-W G A C A A T W-3'	ImPyPy-β-PyHp-γ-PyHp-β-ImHpPy
1926β) 5'-W G A C A A A W-3'	ImPyPy-β-PyPy-γ-HpHp-β-ImHpPy
1927β) 5'-W G A C A A G W-3'	ImPyPy-β-PyIm-γ-PyHp-β-ImHpPy
1928β) 5'-W G A C A A C W-3'	ImPyPy-β-PyPy-γ-ImHp-β-ImHpPy
1929β) 5'-W G A C A G T W-3'	ImPyPy-β-ImHp-γ-PyPy-β-ImHpPy
1930β) 5'-W G A C A G A W-3'	ImPyPy-β-ImPy-γ-HpPy-β-ImHpPy
1931β) 5'-W G A C A G G W-3'	ImPyPy-β-ImIm-γ-PyPy-β-ImHpPy
1932β) 5'-W G A C A G C W-3'	ImPyPy-β-ImPy-γ-ImPy-β-ImHpPy
1933β) 5'-W G A C A C T W-3'	ImPyPy-β-PyHp-γ-PyIm-β-ImHpPy
1934β) 5'-W G A C A C A W-3'	ImPyPy-β-PyPy-γ-HpIm-β-ImHpPy
1935β) 5'-W G A C A C G W-3'	ImPyPy-β-PyIm-γ-PyIm-β-ImHpPy
1936β) 5'-W G A C A C C W-3'	ImPyPy-β-PyPy-γ-ImIm-β-ImHpPy

TABLE 171: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGACSNNW-3'

DNA sequence	aromatic amino acid sequence
1937β) 5'-W G A C G T T W-3'	ImPy-β-ImHpHp-γ-PyPy-β-ImHpPy
1938β) 5'-W G A C G T A W-3'	ImPy-β-ImHpPy-γ-HpPy-β-ImHpPy
1939β) 5'-W G A C G T G W-3'	ImPy-β-ImHpIm-γ-PyPy-β-ImHpPy
1940β) 5'-W G A C G T C W-3'	ImPy-β-ImHpPy-γ-ImPy-β-ImHpPy
1941β) 5'-W G A C G A T W-3'	ImPy-β-ImPyHp-γ-PyHp-β-ImHpPy
1942β) 5'-W G A C G A A W-3'	ImPy-β-ImPyPy-γ-HpHp-β-ImHpPy
1943β) 5'-W G A C G A G W-3'	ImPy-β-ImPyIm-γ-PyHp-β-ImHpPy
1944β) 5'-W G A C G A C W-3'	ImPy-β-ImPyPy-γ-ImHp-β-ImHpPy
1945β) 5'-W G A C G G T W-3'	ImPy-β-ImImHp-γ-PyPy-β-ImHpPy
1946β) 5'-W G A C G G A W-3'	ImPy-β-ImImPy-γ-HpPy-β-ImHpPy
1947β) 5'-W G A C G C T W-3'	ImPy-β-ImPyHp-γ-PyIm-β-ImHpPy
1948β) 5'-W G A C G C A W-3'	ImPy-β-ImPyPy-γ-HpIm-β-ImHpPy
1949β) 5'-W G A C C T T W-3'	ImPy-β-PyHpHp-γ-Py-β-ImImHpPy
1950β) 5'-W G A C C T A W-3'	ImPy-β-PyHpPy-γ-Hp-β-ImImHpPy
1951β) 5'-W G A C C T G W-3'	ImPy-β-PyHpIm-γ-Py-β-ImImHpPy
1952β) 5'-W G A C C T C W-3'	ImPy-β-PyHpPy-γ-Im-β-ImImHpPy
1953β) 5'-W G A C C A T W-3'	ImPy-β-PyPyHp-γ-Py-β-ImImHpPy
1954β) 5'-W G A C C A A W-3'	ImPy-β-PyPyPy-γ-Hp-β-ImImHpPy
1955β) 5'-W G A C C A G W-3'	ImPy-β-PyPyIm-γ-Py-β-ImImHpPy
1956β) 5'-W G A C C A C W-3'	ImPy-β-PyPyPy-γ-Im-β-ImImHpPy
1957β) 5'-W G A C C G T W-3'	ImPy-β-PyImHp-γ-Py-β-ImImHpPy
1958β) 5'-W G A C C G A W-3'	ImPy-β-PyImPy-γ-Hp-β-ImImHpPy
1959β) 5'-W G A C C C T W-3'	ImPy-β-PyPyHp-γ-PyImImIm-β-Py
1960β) 5'-W G A C C C A W-3'	ImPy-β-PyPyPy-γ-HpImImIm-β-Py
1961β) 5'-W G A C G G G W-3'	ImPy-β-ImImIm-γ-PyPy-β-ImHpPy
1962β) 5'-W G A C G G C W-3'	ImPy-β-ImImPy-γ-ImPy-β-ImHpPy
1963β) 5'-W G A C G C G W-3'	ImPy-β-ImPyIm-γ-PyIm-β-ImHpPy
1964β) 5'-W G A C G C C W-3'	ImPy-β-ImPyPy-γ-ImIm-β-ImHpPy
1965β) 5'-W G A C C G G W-3'	ImPy-β-PyImIm-γ-Py-β-ImImHpPy
1966β) 5'-W G A C C G C W-3'	ImPy-β-PyImPy-γ-Im-β-ImImHpPy
1967β) 5'-W G A C C C G W-3'	ImPy-β-PyPyIm-γ-PyImImIm-β-Py
1968β) 5'-W G A C C C C W-3'	ImPy-β-PyPyPy-γ-ImImImIm-β-Py

TABLE 172: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGTGWNNW-3'

DNA sequence	aromatic amino acid sequence
1969β) 5'-W G T G T T T W-3'	Im-β-ImHpHpHp-γ-PyPyPyPy-β-Py
1970β) 5'-W G T G T T A W-3'	Im-β-ImHpHpPy-γ-HpPyPyPy-β-Py
1971β) 5'-W G T G T T G W-3'	Im-β-ImHpHpIm-γ-PyPyPyPy-β-Py
1972β) 5'-W G T G T T C W-3'	Im-β-ImHpHpPy-γ-ImPyPyPy-β-Py
1973β) 5'-W G T G T A T W-3'	Im-β-ImHpPyHp-γ-PyHpPyPy-β-Py
1974β) 5'-W G T G T A A W-3'	Im-β-ImHpPyPy-γ-HpHpPyPy-β-Py
1975β) 5'-W G T G T A G W-3'	Im-β-ImHpPyIm-γ-PyHpPyPy-β-Py
1976β) 5'-W G T G T A C W-3'	Im-β-ImHpPyPy-γ-ImHpPyPy-β-Py
1977β) 5'-W G T G T G T W-3'	Im-β-ImHpImHp-γ-PyPyPyPy-β-Py
1978β) 5'-W G T G T G A W-3'	Im-β-ImHpImPy-γ-HpPyPyPy-β-Py
1979β) 5'-W G T G T G G W-3'	Im-β-ImHpImIm-γ-PyPyPyPy-β-Py
1980β) 5'-W G T G T G C W-3'	Im-β-ImHpImPy-γ-ImPyPyPy-β-Py
1981β) 5'-W G T G T C T W-3'	Im-β-ImHpPyHp-γ-PyImPyPy-β-Py
1982β) 5'-W G T G T C A W-3'	Im-β-ImHpPyPy-γ-HpImPyPy-β-Py
1983β) 5'-W G T G T C G W-3'	Im-β-ImHpPyIm-γ-PyImPyPy-β-Py
1984β) 5'-W G T G T C C W-3'	Im-β-ImHpPyPy-γ-ImImPyPy-β-Py
1985β) 5'-W G T G A T T W-3'	Im-β-ImPyHpHp-γ-PyPyHpPy-β-Py
1986β) 5'-W G T G A T A W-3'	Im-β-ImPyHpPy-γ-HpPyHpPy-β-Py
1987β) 5'-W G T G A T G W-3'	Im-β-ImPyHpIm-γ-PyPyHpPy-β-Py
1988β) 5'-W G T G A T C W-3'	Im-β-ImPyHpPy-γ-ImPyHpPy-β-Py
1989β) 5'-W G T G A A T W-3'	Im-β-ImPyPyHp-γ-PyHpHpPy-β-Py
1990β) 5'-W G T G A A A W-3'	Im-β-ImPyPyPy-γ-HpHpHpPy-β-Py
1991β) 5'-W G T G A A G W-3'	Im-β-ImPyPyIm-γ-PyHpHpPy-β-Py
1992β) 5'-W G T G A A C W-3'	Im-β-ImPyPyPy-γ-ImHpHpPy-β-Py
1993β) 5'-W G T G A G T W-3'	Im-β-ImPyImHp-γ-PyPyHpPy-β-Py
1994β) 5'-W G T G A G A W-3'	Im-β-ImPyImPy-γ-HpPyHpPy-β-Py
1995β) 5'-W G T G A G G W-3'	Im-β-ImPyImIm-γ-PyPyHpPy-β-Py
1996β) 5'-W G T G A G C W-3'	Im-β-ImPyImPy-γ-ImPyHpPy-β-Py
1997β) 5'-W G T G A C T W-3'	Im-β-ImPyPyHp-γ-PyImHpPy-β-Py
1998β) 5'-W G T G A C A W-3'	Im-β-ImPyPyPy-γ-HpImHpPy-β-Py
1999β) 5'-W G T G A C G W-3'	Im-β-ImPyPyIm-γ-PyImHpPy-β-Py
2000β) 5'-W G T G A C C W-3'	Im-β-ImPyPyPy-γ-ImImHpPy-β-Py

TABLE 173: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGTGSNNW-3'

DNA sequence	aromatic amino acid sequence
2001β) 5'-W G T G G T T W-3'	Im-β-ImImHpHp-γ-PyPyPyPy-β-Py
2002β) 5'-W G T G G T A W-3'	Im-β-ImImHpPy-γ-HpPyPyPy-β-Py
2003β) 5'-W G T G G T G W-3'	Im-β-ImImHpIm-γ-PyPyPyPy-β-Py
2004β) 5'-W G T G G T C W-3'	Im-β-ImImHpPy-γ-ImPyPyPy-β-Py
2005β) 5'-W G T G G A T W-3'	Im-β-ImImPyHp-γ-PyHpPyPy-β-Py
2006β) 5'-W G T G G A A W-3'	Im-β-ImImPyPy-γ-HpHpPyPy-β-Py
2007β) 5'-W G T G G A G W-3'	Im-β-ImImPyIm-γ-PyHpPyPy-β-Py
2008β) 5'-W G T G G A C W-3'	Im-β-ImImPyPy-γ-ImHpPyPy-β-Py
2009β) 5'-W G T G G G T W-3'	Im-β-ImImImHp-γ-PyPyPyPy-β-Py
2010β) 5'-W G T G G G A W-3'	Im-β-ImImImPy-γ-HpPyPyPy-β-Py
2011β) 5'-W G T G G C T W-3'	Im-β-ImImPyHp-γ-PyImPyPy-β-Py
2012β) 5'-W G T G G C A W-3'	Im-β-ImImPyPy-γ-HpImPyPy-β-Py
2013β) 5'-W G T G C T T W-3'	Im-β-ImPyHpHp-γ-PyPyImPy-β-Py
2014β) 5'-W G T G C T A W-3'	Im-β-ImPyHpPy-γ-HpPyImPy-β-Py
2015β) 5'-W G T G C T G W-3'	Im-β-ImPyHpIm-γ-PyPyImPy-β-Py
2016β) 5'-W G T G C T C W-3'	Im-β-ImPyHpPy-γ-ImPyImPy-β-Py
2017β) 5'-W G T G C A T W-3'	Im-β-ImPyPyHp-γ-PyHpImPy-β-Py
2018β) 5'-W G T G C A A W-3'	Im-β-ImPyPyPy-γ-HpHpImPy-β-Py
2019β) 5'-W G T G C A G W-3'	Im-β-ImPyPyIm-γ-PyHpImPy-β-Py
2020β) 5'-W G T G C A C W-3'	Im-β-ImPyPyPy-γ-ImHpImPy-β-Py
2021β) 5'-W G T G C G T W-3'	Im-β-ImPyImHp-γ-PyPyImPy-β-Py
2022β) 5'-W G T G C G A W-3'	Im-β-ImPyImPy-γ-HpPyImPy-β-Py
2023β) 5'-W G T G C C T W-3'	Im-β-ImPyPyHp-γ-PyImImPy-β-Py
2024β) 5'-W G T G C C A W-3'	Im-β-ImPyPyPy-γ-HpImImPy-β-Py
2025β) 5'-W G T G G G G W-3'	Im-β-ImImImIm-γ-PyPyPyPy-β-Py
2026β) 5'-W G T G G G C W-3'	Im-β-ImImImPy-γ-ImPyPyPy-β-Py
2027β) 5'-W G T G G C G W-3'	Im-β-ImImPyIm-γ-PyImPyPy-β-Py
2028β) 5'-W G T G G C C W-3'	Im-β-ImImPyPy-γ-ImImPyPy-β-Py
2029β) 5'-W G T G C G G W-3'	Im-β-mPyImIm-γ-PyPyImPy-β-Py
2030β) 5'-W G T G C G C W-3'	Im-β-ImPyImPy-γ-ImPyImPy-β-Py
2031β) 5'-W G T G C C G W-3'	Im-β-ImPyPyIm-γ-PyImImPy-β-Py
2032β) 5'-W G T G C C C W-3'	Im-β-ImPyPyPy-γ-ImImImPy-β-Py

TABLE 174: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGTTWNNW-3'

	DNA sequence	aromatic amino acid sequence
2033β)	5'-W G T T T T T W-3'	ImHp-β-HpHpHp-γ-PyPyPy-β-PyPy
2034β)	5'-W G T T T T A W-3'	ImHp-β-HpHpPy-γ-HpPyPy-β-PyPy
2035β)	5'-W G T T T T G W-3'	ImHp-β-HpHpIm-γ-PyPyPy-β-PyPy
2036β)	5'-W G T T T T C W-3'	ImHp-β-HpHpPy-γ-ImPyPy-β-PyPy
2037β)	5'-W G T T T A T W-3'	ImHp-β-HpPyHp-γ-PyHpPy-β-PyPy
2038β)	5'-W G T T T A A W-3'	ImHp-β-HpPyPy-γ-HpHpPy-β-PyPy
2039β)	5'-W G T T T A G W-3'	ImHp-β-HpPyIm-γ-PyHpPy-β-PyPy
2040β)	5'-W G T T T A C W-3'	ImHp-β-HpPyPy-γ-ImHpPy-β-PyPy
2041β)	5'-W G T T T G T W-3'	ImHp-β-HpImHp-γ-PyPyPy-β-PyPy
2042β)	5'-W G T T T G A W-3'	ImHp-β-HpImPy-γ-HpPyPy-β-PyPy
2043β)	5'-W G T T T G G W-3'	ImHp-β-HpImIm-γ-PyPyPy-β-PyPy
2044β)	5'-W G T T T G C W-3'	ImHp-β-HpImPy-γ-ImPyPy-β-PyPy
2045β)	5'-W G T T T C T W-3'	ImHp-β-HpPyHp-γ-PyImPy-β-PyPy
2046β)	5'-W G T T T C A W-3'	ImHp-β-HpPyPy-γ-HpImPy-β-PyPy
2047β)	5'-W G T T T C G W-3'	ImHp-β-HpPyIm-γ-PyImPy-β-PyPy
2048β)	5'-W G T T T C C W-3'	ImHp-β-HpPyPy-γ-ImImPy-β-PyPy
2049β)	5'-W G T T A T T W-3'	ImHp-β-PyHpHp-γ-PyPyHp-β-PyPy
2050β)	5'-W G T T A T A W-3'	ImHp-β-PyHpPy-γ-HpPyHp-β-PyPy
2051β)	5'-W G T T A T G W-3'	ImHp-β-PyHpIm-γ-PyPyHp-β-PyPy
2052β)	5'-W G T T A T C W-3'	ImHp-β-PyHpPy-γ-ImPyHp-β-PyPy
2053β)	5'-W G T T A A T W-3'	ImHp-β-PyPyHp-γ-PyHpHp-β-PyPy
2054β)	5'-W G T T A A A W-3'	ImHp-β-PyPyPy-γ-HpHpHp-β-PyPy
2055β)	5'-W G T T A A G W-3'	ImHp-β-PyPyIm-γ-PyHpHp-β-PyPy
2056β)	5'-W G T T A A C W-3'	ImHp-β-PyPyPy-γ-ImHpHp-β-PyPy
2057β)	5'-W G T T A G T W-3'	ImHp-β-PyImHp-γ-PyPyHp-β-PyPy
2058β)	5'-W G T T A G A W-3'	ImHp-β-PyImPy-γ-HpPyHp-β-PyPy
2059β)	5'-W G T T A G G W-3'	ImHp-β-PyImIm-γ-PyPyHp-β-PyPy
2060β)	5'-W G T T A G C W-3'	ImHp-β-PyImPy-γ-ImPyHp-β-PyPy
2061β)	5'-W G T T A C T W-3'	ImHp-β-PyPyHp-γ-PyImHp-β-PyPy
2062β)	5'-W G T T A C A W-3'	ImHp-β-PyPyPy-γ-HpImHp-β-PyPy
2063β)	5'-W G T T A C G W-3'	ImHp-β-PyPyIm-γ-PyImHp-β-PyPy
2064β)	5'-W G T T A C C W-3'	ImHp-β-PyPyPy-γ-ImImHp-β-PyPy

TABLE 175: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGTTSNNW-3'

DNA sequence	aromatic amino acid sequence
2065β) 5'-W G T T G T T W-3'	ImHp-β-ImHpHp-γ-PyPyPy-β-PyPy
2066β) 5'-W G T T G T A W-3'	ImHp-β-ImHpPy-γ-HpPyPy-β-PyPy
2067β) 5'-W G T T G T G W-3'	ImHp-β-ImHpIm-γ-PyPyPy-β-PyPy
2068β) 5'-W G T T G T C W-3'	ImHp-β-ImHpPy-γ-ImPyPy-β-PyPy
2069β) 5'-W G T T G A T W-3'	ImHp-β-ImPyHp-γ-PyHpPy-β-PyPy
2070β) 5'-W G T T G A A W-3'	ImHp-β-ImPyPy-γ-HpHpPy-β-PyPy
2071β) 5'-W G T T G A G W-3'	ImHp-β-ImPyIm-γ-PyHpPy-β-PyPy
2072β) 5'-W G T T G A C W-3'	ImHp-β-ImPyPy-γ-ImHpPy-β-PyPy
2073β) 5'-W G T T G G T W-3'	ImHp-β-ImImHp-γ-PyPyPy-β-PyPy
2074β) 5'-W G T T G G A W-3'	ImHp-β-ImImPy-γ-HpPyPy-β-PyPy
2075β) 5'-W G T T G C T W-3'	ImHp-β-ImPyHp-γ-PyImPy-β-PyPy
2076β) 5'-W G T T G C A W-3'	ImHp-β-ImPyPy-γ-HpImPy-β-PyPy
2077β) 5'-W G T T G G G W-3'	ImHp-β-ImImIm-γ-PyPyPy-β-PyPy
2078β) 5'-W G T T G G C W-3'	ImHp-β-ImImPy-γ-ImPyPy-β-PyPy
2079β) 5'-W G T T G C G W-3'	ImHp-β-ImPyIm-γ-PyImPy-β-PyPy
2080β) 5'-W G T T G C C W-3'	ImHp-β-ImPyPy-γ-ImImPy-β-PyPy
2081β) 5'-W G T T C T T W-3'	ImHp-β-PyHpHp-γ-PyPyIm-β-PyPy
2082β) 5'-W G T T C T A W-3'	ImHp-β-PyHpPy-γ-HpPyIm-β-PyPy
2083β) 5'-W G T T C T G W-3'	ImHp-β-PyHpIm-γ-PyPyIm-β-PyPy
2084β) 5'-W G T T C T C W-3'	ImHp-β-PyHpPy-γ-ImPyIm-β-PyPy
2085β) 5'-W G T T C A T W-3'	ImHp-β-PyPyHp-γ-PyHpIm-β-PyPy
2086β) 5'-W G T T C A A W-3'	ImHp-β-PyPyPy-γ-HpHpIm-β-PyPy
2087β) 5'-W G T T C A G W-3'	ImHp-β-PyPyIm-γ-PyHpIm-β-PyPy
2088β) 5'-W G T T C A C W-3'	ImHp-β-PyPyPy-γ-ImHpIm-β-PyPy
2089β) 5'-W G T T C G T W-3'	ImHp-β-PyImHp-γ-PyPyIm-β-PyPy
2090β) 5'-W G T T C G A W-3'	ImHp-β-PyImPy-γ-HpPyIm-β-PyPy
2091β) 5'-W G T T C C T W-3'	ImHp-β-PyPyHp-γ-PyImIm-β-PyPy
2092β) 5'-W G T T C C A W-3'	ImHp-β-PyPyPy-γ-HpImIm-β-PyPy
2093β) 5'-W G T T C G G W-3'	ImHp-β-PyImIm-γ-PyPyIm-β-PyPy
2094β) 5'-W G T T C G C W-3'	ImHp-β-PyImPy-γ-ImPyIm-β-PyPy
2095β) 5'-W G T T C C G W-3'	ImHp-β-PyPyIm-γ-PyImIm-β-PyPy
2096β) 5'-W G T T C C C W-3'	ImHp-β-PyPyPy-γ-ImImIm-β-PyPy

TABLE 176: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGTAWNNW-3'

DNA sequence	aromatic amino acid sequence
2097β) 5'-W G T A T T T W-3'	ImHp-β-HpHpHp-γ-PyPyPy-β-PyPy
2098β) 5'-W G T A T T A W-3'	ImHp-β-HpHpPy-γ-HpPyPy-β-PyPy
2099β) 5'-W G T A T T G W-3'	ImHp-β-HpHpIm-γ-PyPyPy-β-PyPy
2100β) 5'-W G T A T T C W-3'	ImHp-β-HpHpPy-γ-ImPyPy-β-PyPy
2101β) 5'-W G T A T A T W-3'	ImHp-β-HpPyHp-γ-PyHpPy-β-PyPy
2102β) 5'-W G T A T A A W-3'	ImHp-β-HpPyPy-γ-HpHpPy-β-PyPy
2103β) 5'-W G T A T A G W-3'	ImHp-β-HpPyIm-γ-PyHpPy-β-PyPy
2104β) 5'-W G T A T A C W-3'	ImHp-β-HpPyPy-γ-ImHpPy-β-PyPy
2105β) 5'-W G T A T G T W-3'	ImHp-β-HpImHp-γ-PyPyPy-β-PyPy
2106β) 5'-W G T A T G A W-3'	ImHp-β-HpImPy-γ-HpPyPy-β-PyPy
2107β) 5'-W G T A T G G W-3'	ImHp-β-HpImIm-γ-PyPyPy-β-PyPy
2108β) 5'-W G T A T G C W-3'	ImHp-β-HpImPy-γ-ImPyPy-β-PyPy
2109β) 5'-W G T A T C T W-3'	ImHp-β-HpPyHp-γ-PyImPy-β-PyPy
2110β) 5'-W G T A T C A W-3'	ImHp-β-HpPyPy-γ-HpImPy-β-PyPy
2111β) 5'-W G T A T C G W-3'	ImHp-β-HpPyIm-γ-PyImPy-β-PyPy
2112β) 5'-W G T A T C C W-3'	ImHp-β-HpPyPy-γ-ImImPy-β-PyPy
2113β) 5'-W G T A A T T W-3'	ImHp-β-PyHpHp-γ-PyPyHp-β-PyPy
2114β) 5'-W G T A A T A W-3'	ImHp-β-PyHpPy-γ-HpPyHp-β-PyPy
2115β) 5'-W G T A A T G W-3'	ImHp-β-PyHpIm-γ-PyPyHp-β-PyPy
2116β) 5'-W G T A A T C W-3'	ImHp-β-PyHpPy-γ-ImPyHp-β-PyPy
2117β) 5'-W G T A A A T W-3'	ImHp-β-PyPyHp-γ-PyHpHp-β-PyPy
2118β) 5'-W G T A A A A W-3'	ImHp-β-PyPyPy-γ-HpHpHp-β-PyPy
2119β) 5'-W G T A A A G W-3'	ImHp-β-PyPyIm-γ-PyHpHp-β-PyPy
2120β) 5'-W G T A A A C W-3'	ImHp-β-PyPyPy-γ-ImHpHp-β-PyPy
2121β) 5'-W G T A A G T W-3'	ImHp-β-PyImHp-γ-PyPyHp-β-PyPy
2122β) 5'-W G T A A G A W-3'	ImHp-β-PyImPy-γ-HpPyHp-β-PyPy
2123β) 5'-W G T A A G G W-3'	ImHp-β-PyImIm-γ-PyPyHp-β-PyPy
2124β) 5'-W G T A A G C W-3'	ImHp-β-PyImPy-γ-ImPyHp-β-PyPy
2125β) 5'-W G T A A C T W-3'	ImHpPyPyPyHp-γ-PyImHp-β-PyPy
2126β) 5'-W G T A A C A W-3'	ImHpPyPyPyPy-γ-HpImHp-β-PyPy
2127β) 5'-W G T A A C G W-3'	ImHpPyPyPyIm-γ-PyImHp-β-PyPy
2128β) 5'-W G T A A C C W-3'	ImHpPyPyPyPy-γ-ImImHp-β-PyPy

TABLE 177: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGTASNNW-3'

	DNA sequence	aromatic amino acid sequence
2129β)	5'-W G T A G T T W-3'	ImHp-β-ImHpHp-γ-PyPyPy-β-PyPy
2130β)	5'-W G T A G T A W-3'	ImHp-β-ImHpPy-γ-HpPyPy-β-PyPy
2131β)	5'-W G T A G T G W-3'	ImHp-β-ImHpIm-γ-PyPyPy-β-PyPy
2132β)	5'-W G T A G T C W-3'	ImHp-β-ImHpPy-γ-ImPyPy-β-PyPy
2133β)	5'-W G T A G A T W-3'	ImHp-β-ImPyHp-γ-PyHpPy-β-PyPy
2134β)	5'-W G T A G A A W-3'	ImHp-β-ImPyPy-γ-HpHpPy-β-PyPy
2135β)	5'-W G T A G A G W-3'	ImHp-β-ImPyIm-γ-PyHpPy-β-PyPy
2136β)	5'-W G T A G A C W-3'	ImHp-β-ImPyPy-γ-ImHpPy-β-PyPy
2137β)	5'-W G T A G G T W-3'	ImHp-β-ImImHp-γ-PyPyPy-β-PyPy
2138β)	5'-W G T A G G A W-3'	ImHp-β-ImImPy-γ-HpPyPy-β-PyPy
2139β)	5'-W G T A G C T W-3'	ImHp-β-ImPyHp-γ-PyImPy-β-PyPy
2140β)	5'-W G T A G C A W-3'	ImHp-β-ImPyPy-γ-HpImPy-β-PyPy
2141β)	5'-W G T A G G G W-3'	ImHp-β-ImImIm-γ-PyPyPy-β-PyPy
2142β)	5'-W G T A G G C W-3'	ImHp-β-ImImPy-γ-ImPyPy-β-PyPy
2143β)	5'-W G T A G C G W-3'	ImHp-β-ImPyIm-γ-PyImPy-β-PyPy
2144β)	5'-W G T A G C C W-3'	ImHp-β-ImPyPy-γ-ImImPy-β-PyPy
2145β)	5'-W G T A C T T W-3'	ImHp-β-PyHpHp-γ-PyPyIm-β-PyPy
2146β)	5'-W G T A C T A W-3'	ImHp-β-PyHpPy-γ-HpPyIm-β-PyPy
2147β)	5'-W G T A C T G W-3'	ImHp-β-PyHpIm-γ-PyPyIm-β-PyPy
2148β)	5'-W G T A C T C W-3'	ImHp-β-PyHpPy-γ-ImPyIm-β-PyPy
2149β)	5'-W G T A C A T W-3'	ImHp-β-PyPyHp-γ-PyHpIm-β-PyPy
2150β)	5'-W G T A C A A W-3'	ImHp-β-PyPyPy-γ-HpHpIm-β-PyPy
2151β)	5'-W G T A C A G W-3'	ImHp-β-PyPyIm-γ-PyHpIm-β-PyPy
2152β)	5'-W G T A C A C W-3'	ImHp-β-PyPyPy-γ-ImHpIm-β-PyPy
2153β)	5'-W G T A C G T W-3'	ImHp-β-PyImHp-γ-PyPyIm-β-PyPy
2154β)	5'-W G T A C G A W-3'	ImHp-β-PyImPy-γ-HpPyIm-β-PyPy
2155β)	5'-W G T A C C T W-3'	ImHp-β-PyPyHp-γ-PyImIm-β-PyPy
2156β)	5'-W G T A C C A W-3'	ImHp-β-PyPyPy-γ-HpImIm-β-PyPy
2157β)	5'-W G T A C G G W-3'	ImHp-β-PyImIm-γ-PyPyIm-β-PyPy
2158β)	5'-W G T A C G C W-3'	ImHp-β-PyImPy-γ-ImPyIm-β-PyPy
2159β)	5'-W G T A C C G W-3'	ImHp-β-PyPyIm-γ-PyImIm-β-PyPy
2160β)	5'-W G T A C C C W-3'	ImHp-β-PyPyPy-γ-ImImIm-β-PyPy

TABLE 178: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGTCWNNW-3'

DNA sequence	aromatic amino acid sequence
2161β) 5'-W G T C T T T W-3'	ImHpPy-β-HpHp-γ-PyPy-β-ImPyPy
2162β) 5'-W G T C T T A W-3'	ImHpPy-β-HpPy-γ-HpPy-β-ImPyPy
2163β) 5'-W G T C T T G W-3'	ImHpPy-β-HpIm-γ-PyPy-β-ImPyPy
2164β) 5'-W G T C T T C W-3'	ImHpPy-β-HpPy-γ-ImPy-β-ImPyPy
2165β) 5'-W G T C T A T W-3'	ImHpPy-β-PyHp-γ-PyHp-β-ImPyPy
2166β) 5'-W G T C T A A W-3'	ImHpPy-β-PyPy-γ-HpHp-β-ImPyPy
2167β) 5'-W G T C T A G W-3'	ImHpPy-β-PyIm-γ-PyHp-β-ImPyPy
2168β) 5'-W G T C T A C W-3'	ImHpPy-β-PyPy-γ-ImHp-β-ImPyPy
2169β) 5'-W G T C T G T W-3'	ImHpPy-β-ImHp-γ-PyPy-β-ImPyPy
2170β) 5'-W G T C T G A W-3'	ImHpPy-β-ImPy-γ-HpPy-β-ImPyPy
2171β) 5'-W G T C T G G W-3'	ImHpPy-β-ImIm-γ-PyPy-β-ImPyPy
2172β) 5'-W G T C T G C W-3'	ImHpPy-β-ImPy-γ-ImPy-β-ImPyPy
2173β) 5'-W G T C T C T W-3'	ImHpPy-β-PyHp-γ-PyIm-β-ImPyPy
2174β) 5'-W G T C T C A W-3'	ImHpPy-β-PyPy-γ-HpIm-β-ImPyPy
2175β) 5'-W G T C T C G W-3'	ImHpPy-β-PyIm-γ-PyIm-β-ImPyPy
2176β) 5'-W G T C T C C W-3'	ImHpPy-β-PyPy-γ-ImIm-β-ImPyPy
2177β) 5'-W G T C A T T W-3'	ImHpPy-β-HpHp-γ-PyPy-β-ImPyPy
2178β) 5'-W G T C A T A W-3'	ImHpPy-β-HpPy-γ-HpPy-β-ImPyPy
2179β) 5'-W G T C A T G W-3'	ImHpPy-β-HpIm-γ-PyPy-β-ImPyPy
2180β) 5'-W G T C A T C W-3'	ImHpPy-β-HpPy-γ-ImPy-β-ImPyPy
2181β) 5'-W G T C A A T W-3'	ImHpPy-β-PyHp-γ-PyHp-β-ImPyPy
2182β) 5'-W G T C A A A W-3'	ImHpPy-β-PyPy-γ-HpHp-β-ImPyPy
2183β) 5'-W G T C A A G W-3'	ImHpPy-β-PyIm-γ-PyHp-β-ImPyPy
2184β) 5'-W G T C A A C W-3'	ImHpPy-β-PyPy-γ-ImHp-β-ImPyPy
2185β) 5'-W G T C A G T W-3'	ImHpPy-β-ImHp-γ-PyPy-β-ImPyPy
2186β) 5'-W G T C A G A W-3'	ImHpPy-β-ImPy-γ-HpPy-β-ImPyPy
2187β) 5'-W G T C A G G W-3'	ImHpPy-β-ImIm-γ-PyPy-β-ImPyPy
2188β) 5'-W G T C A G C W-3'	ImHpPy-β-ImPy-γ-ImPy-β-ImPyPy
2189β) 5'-W G T C A C T W-3'	ImHpPy-β-PyHp-γ-PyIm-β-ImPyPy
2190β) 5'-W G T C A C A W-3'	ImHpPy-β-PyPy-γ-HpIm-β-ImPyPy
2191β) 5'-W G T C A C G W-3'	ImHpPy-β-PyIm-γ-PyIm-β-ImPyPy
2192β) 5'-W G T C A C C W-3'	ImHpPy-β-PyPy-γ-ImIm-β-ImPyPy

TABLE 179: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGTCSNNW-3'

DNA sequence	aromatic amino acid sequence
2193β) 5'-W G T C G T T W-3'	ImHp-β-ImHpHp-γ-PyPy-β-ImPyPy
2194β) 5'-W G T C G T A W-3'	ImHp-β-ImHpPy-γ-HpPy-β-ImPyPy
2195β) 5'-W G T C G T G W-3'	ImHp-β-ImHpIm-γ-PyPy-β-ImPyPy
2196β) 5'-W G T C G T C W-3'	ImHp-β-ImHpPy-γ-ImPy-β-ImPyPy
2197β) 5'-W G T C G A T W-3'	ImHp-β-ImPyHp-γ-PyHp-β-ImPyPy
2198β) 5'-W G T C G A A W-3'	ImHp-β-ImPyPy-γ-HpHp-β-ImPyPy
2199β) 5'-W G T C G A G W-3'	ImHp-β-ImPyIm-γ-PyHp-β-ImPyPy
2200β) 5'-W G T C G A C W-3'	ImHp-β-ImPyPy-γ-ImHp-β-ImPyPy
2201β) 5'-W G T C G G T W-3'	ImHp-β-ImImHp-γ-PyPy-β-ImPyPy
2202β) 5'-W G T C G G A W-3'	ImHp-β-ImImPy-γ-HpPy-β-ImPyPy
2203β) 5'-W G T C G C T W-3'	ImHp-β-ImPyHp-γ-PyIm-β-ImPyPy
2204β) 5'-W G T C G C A W-3'	ImHp-β-ImPyPy-γ-HpIm-β-ImPyPy
2205β) 5'-W G T C C T T W-3'	ImHp-β-PyHpHp-γ-Py-β-ImImPyPy
2206β) 5'-W G T C C T A W-3'	ImHp-β-PyHpPy-γ-Hp-β-ImImPyPy
2207β) 5'-W G T C C T G W-3'	ImHp-β-PyHpIm-γ-Py-β-ImImPyPy
2208β) 5'-W G T C C T C W-3'	ImHp-β-PyHpPy-γ-Im-β-ImImPyPy
2209β) 5'-W G T C C A T W-3'	ImHp-β-PyPyHp-γ-Py-β-ImImPyPy
2210β) 5'-W G T C C A A W-3'	ImHp-β-PyPyPy-γ-Hp-β-ImImPyPy
2211β) 5'-W G T C C A G W-3'	ImHp-β-PyPyIm-γ-Py-β-ImImPyPy
2212β) 5'-W G T C C A C W-3'	ImHp-β-PyPyPy-γ-Im-β-ImImPyPy
2213β) 5'-W G T C C G T W-3'	ImHp-β-PyImHp-γ-Py-β-ImImPyPy
2214β) 5'-W G T C C G A W-3'	ImHp-β-PyImPy-γ-Hp-β-ImImPyPy
2215β) 5'-W G T C C C T W-3'	ImHp-β-PyPyHp-γ-PyImImIm-β-Py
2216β) 5'-W G T C C C A W-3'	ImHp-β-PyPyPy-γ-HpImImIm-β-Py
2217β) 5'-W G T C G G G W-3'	ImHp-β-ImImIm-γ-PyPy-β-ImPyPy
2218β) 5'-W G T C G G C W-3'	ImHp-β-ImImPy-γ-ImPy-β-ImPyPy
2219β) 5'-W G T C G C G W-3'	ImHp-β-ImPyIm-γ-PyIm-β-ImPyPy
2220β) 5'-W G T C G C C W-3'	ImHp-β-ImPyPy-γ-ImIm-β-ImPyPy
2221β) 5'-W G T C C G G W-3'	ImHp-β-PyImIm-γ-Py-β-ImImPyPy
2222β) 5'-W G T C C G C W-3'	ImHp-β-PyImPy-γ-Im-β-ImImPyPy
2223β) 5'-W G T C C C G W-3'	ImHp-β-PyPyIm-γ-PyImImIm-β-Py
2224β) 5'-W G T C C C C W-3'	ImHp-β-PyPyPy-γ-ImImImIm-β-Py

What is claimed is:

1. A method for designing a specific polyamide

$$X_1X_2 \ldots X_m\text{-}\gamma\text{-}X_{(m+1)} \ldots X_{(2m-1)}X_{2m}$$

wherein X_1, X_2, X_m, $X_{(m+1)}$, $X_{(2m-1)}$, and X_{2m} are carboxamide residues forming carboxamide binding pairs X_1/X_{2m}, $X_2/X_{(2m-1)}$, $X_m/X_{(m+1)}$, and γ is γ-aminobuytic acid or 2,4 diaminobutyric acid and Dp is dimethylaminopropylamide, suitable for use as a DNA-binding ligand that is selective for identified target DNA sequences 5'-$WN_1N_2 \ldots N_mW$-3' where m is an integer having a value from 3 to 6, comprising the steps of:

a. identifying a target sequence of double stranded DNA having the form 5'-$WN_1N_2 \ldots N_mW$-3', $N_1N_2 \ldots N_m$ being the sequence to be bound by carboxamide residues, wherein each N is independently chosen from the group A, G, C, and T, each W is independently chosen from the group A and T, and m is an integer having a value from 3 to 6;

b. representing the identified sequence as 5'-W***ab*** . . . ***x***W-3', wherein ***a*** is a first nucleotide to be bound by the X_1 carboxamide residue, ***b*** is a second nucleotide to be bound by the X_2 carboxamide residue, and ***x*** is the corresponding nucleotide to be bound by the X_m carboxamide residue;

c. defining ***a*** as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified sequence;

d. selecting Im as the X_1 carboxamide residue and Py as the X_{2m} carboxamide residue if ***a*** = G;

e. selecting Py as the X_1 carboxamide residue and Im as the X_{2m} carboxamide residue if ***a*** = C;

f. selecting Hp as the X_1 carboxamide residue and Py as the X_{2m} carboxamide residue if ***a*** = T;

g. selecting Py as the X_1 carboxamide residue and Hp as the X_{2m} carboxamide residue if ***a*** = A; and

h. repeating steps c – g for ***b*** through ***x*** until all carboxamide residues are selected.

2. The method of claim 1 further comprising the step of synthesizing the polyamide

$$X_1X_2 \ldots X_m\text{-}\gamma\text{-}X_{(m+1)} \ldots X_{(2m-1)}X_{2m}.$$

3. The method of claim 2 further comprising the step of determining if the binding affinity of the polyamide to the identified sequence is subnanomolar.

4. The method of claim 2 further comprising the step of determining if the sequence specificity of the polyamide is greater or equal to ten.

5. The method of claim 2 further comprising the step of replacing at least one pyrrole residue with a β-alanine residue.

6. A method for designing a selective polyamide molecule $X_1X_2X_3X_4$-γ-$X_5X_6X_7X_8$, wherein X_1, X_2, X_3, X_4, X_5, X_6, X_7, and X_8, are carboxamide residues forming binding pairs X_1/X_8, X_2/X_7, X_3/X_6 and X_4/X_5, and γ is γ-aminobuytic acid or 2,4 diaminobutyric acid suitable for binding to a six base pair sequence of the form 5'-WNNNNW-3' in the minor groove of double stranded DNA, comprising the steps of:

a. identifying a six base pair sequence of double stranded DNA having the form 5'-WNNNNW-3', wherein W is either A or T, NNNN is the sequence to be bound by carboxamide residues, and each N is independently A, G, C, or T;

b. representing the identified sequence as 5'-W***abcd***W-3', wherein ***a*** is a first nucleotide to be bound by a carboxamide residue, ***b*** is a second nucleotide to be bound by a carboxamide residue, ***c*** is a third nucleotide to be bound by a carboxamide residue, and ***d*** is a fourth nucleotide to be bound by a carboxamide residue;

c. defining ***a*** as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;

d. selecting Im as the X_1 carboxamide residue and Py as the X_8 carboxamide residue if ***a*** = G;

e. selecting Py as the X_1 carboxamide residue and Im as the X_8 carboxamide residue if ***a*** = C;

f. selecting Hp as the X_1 carboxamide residue and Py as the X_8 carboxamide residue if ***a*** = T;

g. selecting Py as the X_1 carboxamide residue and Hp as the X_8 carboxamide residue if ***a*** = A;

h. defining ***b*** as A, G, C, or T to correspond to the second nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;

i. selecting Im as the X_2 carboxamide residue and Py as the X_7 carboxamide residue if ***b*** = G;

j. selecting Py as the X_2 carboxamide residue and Im as the X_7 carboxamide residue if ***b*** = C;

k. selecting Hp as the X_2 carboxamide residue and Py as the X_7 carboxamide residue if ***b*** = T;

l. selecting Py as the X_2 carboxamide residue and Hp as the X_7 carboxamide residue if ***b*** = A;

m. defining ***c*** as A, G, C, or T to correspond to the third nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;

n. selecting Im as the X_3 carboxamide residue and Py as the X_6 carboxamide residue if ***c*** = G;

o. selecting Py as the X_3 carboxamide residue and Im as the X_6 carboxamide residue if ***c*** = C;

p. selecting Hp as the X_3 carboxamide residue and Py as the X_6 carboxamide residue if ***c*** = T;

q. selecting Py as the X_3 carboxamide residue and Hp as the X_6 carboxamide residue if ***c*** = A;

r. defining ***d*** as A, G, C, or T to correspond to the fourth nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;

s. selecting Im as the X_4 carboxamide residue and Py as the X_5 carboxamide residue if ***d*** = G;

t. selecting Py as the X_4 carboxamide residue and Im as the X_5 carboxamide residue if ***d*** = C;

u. selecting Hp as the X_4 carboxamide residue and Py as the X_5 carboxamide residue if ***d*** = T; and

v. selecting Py as the X_4 carboxamide residue and Hp as the X_5 carboxamide residue if ***d*** = A.

7. The method of claim 6 further comprising the step of synthesizing the polyamide $X_1X_2X_3X_4$-γ-$X_5X_6X_7X_8$.

8. The method of claim 7 further comprising the step of determining if the binding affinity of the polyamide to the identified sequence is subnanomolar.

9. The method of claim 7 further comprising the step of determining if the sequence specificity of the polyamide is greater or equal to ten.

10. The method of claim 7 further comprising the step of replacing at least one pyrrole residue with a β-alanine residue at a position chosen from the group consisting of X_2, X_3, X_6, and X_7.

11. The method of claim 7 further comprising the step of replacing at least one 3-hydroxypyrrole residue with a β-alanine residue at a position chosen from the group consisting of X_2, X_3, X_6, and X_7.

12. A polyamide composition produced by the process comprising the steps of:

a. identifying a six base pair sequence of double stranded DNA having the form 5'-WNNNNW-3', wherein W is either A or T, NNNN is the sequence to be bound by carboxamide residues, and each N is independently A, G, C, or T;

b. representing the identified sequence as 5'-W***abcd***W-3', wherein ***a*** is a first nucleotide to be bound by a carboxamide residue, ***b*** is a second nucleotide to be bound by a carboxamide residue, ***c*** is a third nucleotide to be bound by a carboxamide residue, and ***d*** is a fourth nucleotide to be bound by a carboxamide residue;

c. defining ***a*** as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;

d. selecting Im as the X_1 carboxamide residue and Py as the X_8 carboxamide residue if ***a*** = G;

e. selecting Py as the X_1 carboxamide residue and Im as the X_8 carboxamide residue if ***a*** = C;

f. selecting Hp as the X_1 carboxamide residue and Py as the X_8 carboxamide residue if ***a*** = T;

g. selecting Py as the X_1 carboxamide residue and Hp as the X_8 carboxamide residue if ***a*** = A;

h. defining ***b*** as A, G, C, or T to correspond to the second nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;

i. selecting Im as the X_2 carboxamide residue and Py as the X_7 carboxamide residue if ***b*** = G;

j. selecting Py as the X_2 carboxamide residue and Im as the X_7 carboxamide residue if ***b*** = C;

k. selecting Hp as the X_2 carboxamide residue and Py as the X_7 carboxamide residue if ***b*** = T;

l. selecting Py as the X_2 carboxamide residue and Hp as the X_7 carboxamide residue if ***b*** = A;

m. defining ***c*** as A, G, C, or T to correspond to the third nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;

n. selecting Im as the X_3 carboxamide residue and Py as the X_6 carboxamide residue if ***c*** = G;

o. selecting Py as the X_3 carboxamide residue and Im as the X_6 carboxamide residue if ***c*** = C;

p. selecting Hp as the X_3 carboxamide residue and Py as the X_6 carboxamide residue if ***c*** = T;

q. selecting Py as the X_3 carboxamide residue and Hp as the X_6 carboxamide residue if ***c*** = A;

r. defining ***d*** as A, G, C, or T to correspond to the fourth nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;

s. selecting Im as the X_4 carboxamide residue and Py as the X_5 carboxamide residue if ***d*** = G;

t. selecting Py as the X_4 carboxamide residue and Im as the X_5 carboxamide residue if ***d*** = C;

u. selecting Hp as the X_4 carboxamide residue and Py as the X_5 carboxamide residue if ***d*** = T;

v. selecting Py as the X_4 carboxamide residue and Hp as the X_5 carboxamide residue if ***d*** = A; and

w. synthesizing the polyamide $X_1X_2X_3X_4$-γ-$X_5X_6X_7X_8$.

13. The polyamides described by the formulas listed in Tables 4 – 19.

14. The polyamides described by the formulas listed in Tables 20 – 83.

15. The polyamides described by the formulas listed in Tables 84 – 179.

16. A method for designing a selective polyamide molecule $X_1X_2X_3X_4X_5$-γ-$X_6X_7X_8X_9X_{10}$, wherein X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, and X_{10} are carboxamide residues forming binding pairs X_1/X_{10}, X_2/X_9, X_3/X_8, X_4/X_7, and X_5/X_6, and γ is γ-aminobuytic acid or 2,4 diaminobutyric acid suitable for binding to a six base pair sequence of the form 5'-WNNNNNW-3' in the minor groove of double stranded DNA, comprising the steps of:

a. identifying a seven base pair sequence of double stranded DNA having the form 5'-WNNNNNW-3', wherein W is either A or T, NNNNN is the sequence to be bound by carboxamide residues, and each N is independently A, G, C, or T;

b. representing the identified sequence as 5'-W***abcde***W-3', wherein ***a*** is a first nucleotide to be bound by a carboxamide residue, ***b*** is a second nucleotide to be

bound by a carboxamide residue, ***c*** is a third nucleotide to be bound by a carboxamide residue, ***d*** is a fourth nucleotide to be bound by a carboxamide residue, and ***e*** is a fifth nucleotide to be bound by a carboxamide residue;

c. defining ***a*** as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified seven base pair sequence;

d. selecting Im as the X_1 carboxamide residue and Py as the X_{10} carboxamide residue if ***a*** = G;

e. selecting Py as the X_1 carboxamide residue and Im as the X_{10} carboxamide residue if ***a*** = C;

f. selecting Hp as the X_1 carboxamide residue and Py as the X_{10} carboxamide residue if ***a*** = T;

g. selecting Py as the X_1 carboxamide residue and Hp as the X_{10} carboxamide residue if ***a*** = A;

h. defining ***b*** as A, G, C, or T to correspond to the second nucleotide to be bound by a carboxamide residue in the identified seven base pair sequence;

i. selecting Im as the X_2 carboxamide residue and Py as the X_9 carboxamide residue if ***b*** = G;

j. selecting Py as the X_2 carboxamide residue and Im as the X_9 carboxamide residue if ***b*** = C;

k. selecting Hp as the X_2 carboxamide residue and Py as the X_9 carboxamide residue if ***b*** = T;

l. selecting Py as the X_2 carboxamide residue and Hp as the X_9 carboxamide residue if ***b*** = A;

m. defining ***c*** as A, G, C, or T to correspond to the third nucleotide to be bound by a carboxamide residue in the identified seven base pair sequence;

n. selecting Im as the X_3 carboxamide residue and Py as the X_8 carboxamide residue if ***c*** = G;

o. selecting Py as the X_3 carboxamide residue and Im as the X_8 carboxamide residue if ***c*** = C;

p. selecting Hp as the X_3 carboxamide residue and Py as the X_8 carboxamide residue if ***c*** = T;

q. selecting Py as the X_3 carboxamide residue and Hp as the X_8 carboxamide residue if ***c*** = A;

r. defining ***d*** as A, G, C, or T to correspond to the fourth nucleotide to be bound by a carboxamide residue in the seven base pair sequence identified sequence;

s. selecting Im as the X4 carboxamide residue and Py as the X7 carboxamide residue if ***d*** = G;

t. selecting Py as the X4 carboxamide residue and Im as the X7 carboxamide residue if ***d*** = C;

u. selecting Hp as the X4 carboxamide residue and Py as the X7 carboxamide residue if ***d*** = T;

v. selecting Py as the X4 carboxamide residue and Hp as the X7 carboxamide residue if ***d*** = A;

w. defining ***e*** as A, G, C, or T to correspond to the fifth nucleotide to be bound by a carboxamide residue in the seven base pair sequence identified sequence;

x. selecting Im as the X5 carboxamide residue and Py as the X6 carboxamide residue if ***e*** = G;

y. selecting Py as the X5 carboxamide residue and Im as the X6 carboxamide residue if ***e*** = C;

z. selecting Hp as the X5 carboxamide residue and Py as the X6 carboxamide residue if ***e*** = T; and

aa. selecting Py as the X5 carboxamide residue and Hp as the X6 carboxamide residue if ***e*** = A.

17. The method of claim 16 further comprising the step of synthesizing the polyamide $X_1X_2X_3X_4X_5$-γ-$X_6X_7X_8X_9X_{10}$,.

18. The method of claim 17 further comprising the step of determining if the binding affinity of the polyamide to the identified sequence is subnanomolar.

19. The method of claim 17 further comprising the step of determining if the sequence specificity of the polyamide is greater or equal to ten.

20. The method of claim 17 further comprising the step of replacing at least one pyrrole residue with a β-alanine residue at a position chosen from the group consisting of X_2, X_3, X_4, X_7, X_8, and X_9.

21. The method of claim 17 further comprising the step of replacing at least one 3-hydroxypyrrole residue with a β-alanine residue at a position chosen from the group consisting of X_2, X_3, X_4, X_7, X_8, and X_9.

22. A polyamide composition produced by the method of claim 17.

23. A polyamide composition produced by the method of claim 18.

24. A polyamide composition produced by the method of claim 19.

25. A polyamide composition produced by the method of claim 20.

26. A polyamide composition produced by the method of claim 21.

27. A method for designing a selective polyamide molecule

$X_1X_2X_3X_4X_5X_6$-γ-$X_7X_8X_9X_{10}X_{11}X_{12}$,

wherein X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10} X_{11}, and X_{12}, are carboxamide residues forming binding pairs X_1/X_{12}, X_2/X_{11}, X_3/X_{10}, X_4/X_9, X_5/X_8, and X_6/X_7, and γ is γ-aminobuytic acid or 2,4 diaminobutyric acid

suitable for binding to a eight base pair sequence of the form 5'-WNNNNNNW-3' in the minor groove of double stranded DNA, comprising the steps of:

a. identifying a eight base pair sequence of double stranded DNA having the form 5'-WNNNNNNW-3', wherein W is either A or T, NNNNNN is the sequence to be bound by carboxamide residues, and each N is independently A, G, C, or T;

b. representing the identified sequence as 5'-W***abcdef***W-3', wherein ***a*** is a first nucleotide to be bound by a carboxamide residue, ***b*** is a second nucleotide to be bound by a carboxamide residue, ***c*** is a third nucleotide to be bound by a carboxamide residue, ***d*** is a fourth nucleotide to be bound by a carboxamide residue, ***e*** is a fifth nucleotide to be bound by a carboxamide residue and ***f*** is a sixth nucleotide to be bound by a carboxamide residue;

c. defining ***a*** as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified eight base pair sequence;

d. selecting Im as the X_1 carboxamide residue and Py as the X_{12} carboxamide residue if ***a*** = G;

e. selecting Py as the X_1 carboxamide residue and Im as the X_{10} carboxamide residue if ***a*** = C;

f. selecting Hp as the X_1 carboxamide residue and Py as the X_{12} carboxamide residue if ***a*** = T;

g. selecting Py as the X_1 carboxamide residue and Hp as the X_{12} carboxamide residue if ***a*** = A;

h. defining ***b*** as A, G, C, or T to correspond to the second nucleotide to be bound by a carboxamide residue in the identified eight base pair sequence;

i. selecting Im as the X_2 carboxamide residue and Py as the X_{11} carboxamide residue if ***b*** = G;

j. selecting Py as the X_2 carboxamide residue and Im as the X_{11} carboxamide residue if ***b*** = C;

k. selecting Hp as the X_2 carboxamide residue and Py as the X_{11} carboxamide residue if ***b*** = T;

l. selecting Py as the X_2 carboxamide residue and Hp as the X_{11} carboxamide residue if ***b*** = A;

m. defining ***c*** as A, G, C, or T to correspond to the third nucleotide to be bound by a carboxamide residue in the identified eight base pair sequence;

n. selecting Im as the X_3 carboxamide residue and Py as the X_{10} carboxamide residue if ***c*** = G;

o. selecting Py as the X_3 carboxamide residue and Im as the X_{10} carboxamide residue if ***c*** = C;

p. selecting Hp as the X_3 carboxamide residue and Py as the X_{10} carboxamide residue if ***c*** = T;

q. selecting Py as the X_3 carboxamide residue and Hp as the X_{10} carboxamide residue if ***c*** = A;

r. defining ***d*** as A, G, C, or T to correspond to the fourth nucleotide to be bound by a carboxamide residue in the eight base pair sequence identified sequence;

s. selecting Im as the X_4 carboxamide residue and Py as the X_9 carboxamide residue if ***d*** = G;

t. selecting Py as the X_4 carboxamide residue and Im as the X_9 carboxamide residue if ***d*** = C;

u. selecting Hp as the X_4 carboxamide residue and Py as the X_9 carboxamide residue if ***d*** = T;

v. selecting Py as the X_4 carboxamide residue and Hp as the X_9 carboxamide residue if ***d*** = A;

w. defining ***e*** as A, G, C, or T to correspond to the fifth nucleotide to be bound by a carboxamide residue in the eight base pair sequence identified sequence;

x. selecting Im as the X_5 carboxamide residue and Py as the X_8 carboxamide residue if ***e*** = G;

y. selecting Py as the X_5 carboxamide residue and Im as the X_8 carboxamide residue if e = C;

z. selecting Hp as the X_5 carboxamide residue and Py as the X_8 carboxamide residue if e = T;

aa. selecting Py as the X_5 carboxamide residue and Hp as the X_8 carboxamide residue if e = A;

bb. defining f as A, G, C, or T to correspond to the sixth nucleotide to be bound by a carboxamide residue in the eight base pair sequence identified sequence;

cc. selecting Im as the X_6 carboxamide residue and Py as the X_7 carboxamide residue if f = G;

dd. selecting Py as the X_6 carboxamide residue and Im as the X_7 carboxamide residue if f = C;

ee. selecting Hp as the X_6 carboxamide residue and Py as the X_7 carboxamide residue if f = T; and

ff. selecting Py as the X_6 carboxamide residue and Hp as the X_7 carboxamide residue if f = A.

28. The method of claim 17 further comprising the step of synthesizing the polyamide $X_1X_2X_3X_4X_5X_6$-γ-$X_7X_8X_9X_{10}X_{11}X_{12}$.

29. The method of claim 28 further comprising the step of determining if the binding affinity of the polyamide to the identified sequence is subnanomolar.

30. The method of claim 28 further comprising the step of determining if the sequence specificity of the polyamide is greater or equal to ten.

31. The method of claim 28 further comprising the step of replacing at least one pyrrole residue with a β-alanine residue at a position chosen from the group consisting of X_2, X_3, X_4, X_5, X_8, X_9, X_{10}, and X_{11}.

32. The method of claim 28 further comprising the step of replacing at least one 3-hydroxypyrrole residue with a β-alanine residue at a position chosen from the group consisting of X_2, X_3, X_4, X_5, X_8, X_9, X_{10}, and X_{11}.

33. A polyamide composition produced by the method of claim 28.

34. A polyamide composition produced by the method of claim 29.

35. A polyamide composition produced by the method of claim 30.

36. A polyamide composition produced by the method of claim 31.

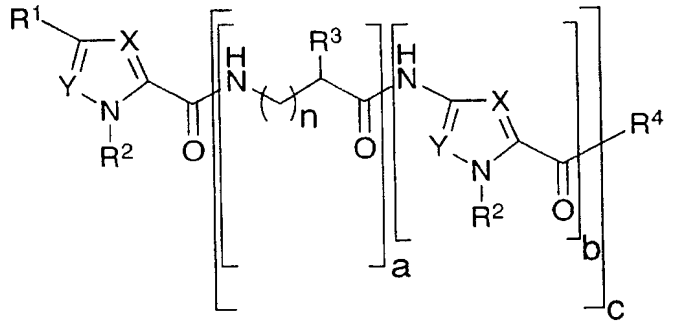
37. A polyamide composition produced by the method of claim 32.

38. A polyamide composition produced by the method of claim 2 wherein one carboxamide binding pair is β/β.

39. A polyamide composition produced by the method of claim 7 wherein one carboxamide binding pair is β/β.

40. A polyamide composition produced by the method of claim 17 wherein one carboxamide binding pair is β/β.

41. A selective polyamide according to claim 1 whereby the polyamide is of the formula:



or a pharmaceutically acceptable salt wherein:

R^1 is chosen from H, NH_2, SH, Cl, Br, F, N-acetyl, or N-formyl;

R^2 is chosen from H, $(CH_2)_mCH_3$, $(CH_2)_mNH_2$, $(CH_2)_mSH$, $(CH_2)_mOH$, $(CH_2)_mNR^5{}_2$, $(CH_2)_mOR^5$, $(CH_2)_mSR^5$, where R^5 = $(CH_2)_mCH_3$, $(CH_2)_mNH_2$, $(CH_2)_mSH$, $(CH_2)_mOH$ and m is an integer from 0 to 6;

R^3 is chosen from H, NH_2, OH, SH, Br, Cl, F, OMe, CH_2OH, CH_2SH, CH_2NH_2;

R^4 is chosen from $-NH(CH_2)_{0\text{-}100}NR^6R^7$ or $NH(CH_2)_pCO\ NH(CH_2)_{0\text{-}100}NR^6R^7$ or NHR^6 or $NH(CH_2)_pCONHR^6$, where R^6 and R^7 are independently chosen from H, Cl, NO, N-acetyl, benzyl, $C_{1\text{-}100}$ alkyl, $C_{1\text{-}100}$ alkylamine, $C_{1\text{-}100}$ alkyldiamine, $C_{1\text{-}100}$ alkylcarboxylate, $C_{1\text{-}100}$ alkenyl, a $C_{1\text{-}100}$ alkynyl, or a $C_{1\text{-}100}L$, where L groups can be independently chosen from but is not limited to arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens to which an antibody binds, solid phase supports, oligodeoxynucleotide, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL-α-lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, an oligodeoxynucleotide, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, tartaric acid, (+)-α-tocopheral;

where X and Y are chosen from the group consisting of N, CH, COH, CCH_3, CNH_2, CCl, CF;

a is an integer having values of 0 or 1;

b is an integer ranging from 1 to 5 inclusive; and

c is an integer value ranging from 2 to 10 inclusive.

42. The polyamide of claim 1 wherein the duplex DNA sequence is a regulatory sequence.

43. The polyamide of claim 1 wherein the duplex DNA sequence is a promoter sequence.

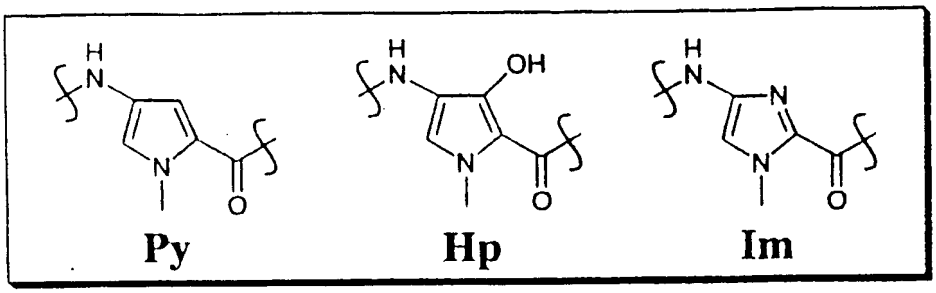
44. The polyamide of claim 1 wherein the duplex DNA sequence is a coding sequence.

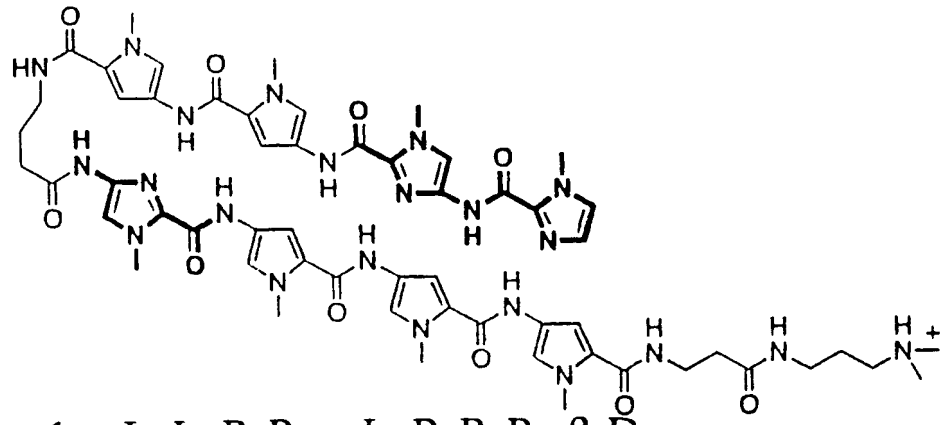
45. The polyamide of claim 1 wherein the duplex DNA sequence is a non-coding sequence.

46. The polyamide of claim 1 wherein the binding of the carboxamide binding pairs to the identified target DNA sequence modulates the expression of a gene.

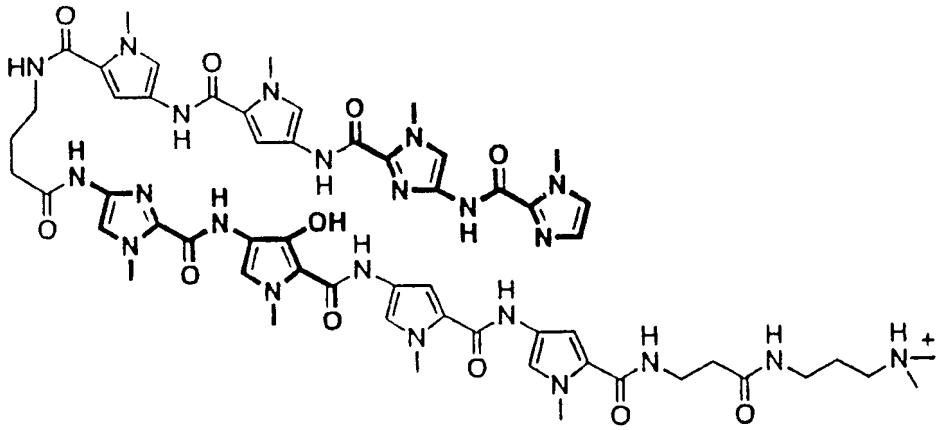
47. A composition conprising an effective amount of the polyamide of claim 1 and a pharmologically suitable excipient.

48. A diagnostic kit comprising the polyamide of claim 1.

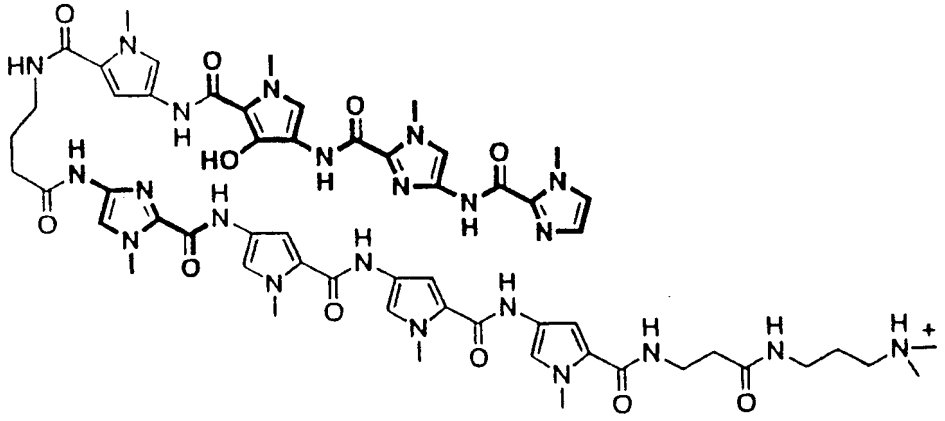




1 ImImPyPy-γ-ImPyPyPy-β-Dp

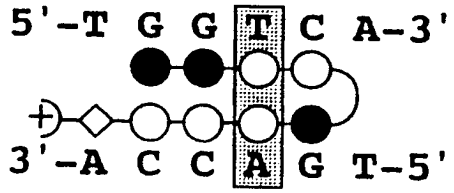


2 ImImPyPy-γ-ImHpPyPy-β-Dp

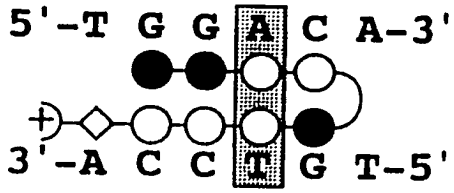


3 ImImHpPy-γ-ImPyPyPy-β-Dp

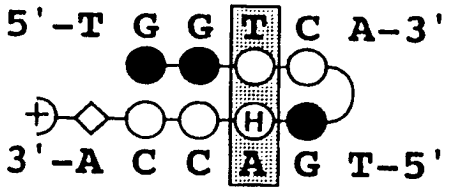
FIG. 1



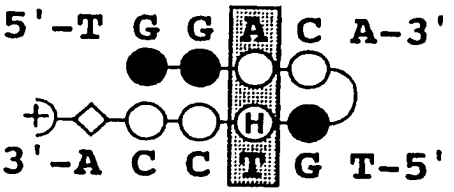
Py/Py with T•A



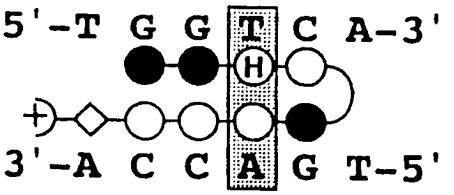
Py/Py with A•T



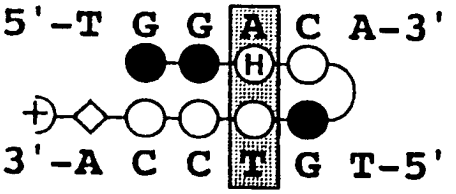
Py/Hp with T•A



Py/Hp with A•T



Hp/Py with T•A



Hp/Py with A•T

FIG. 2

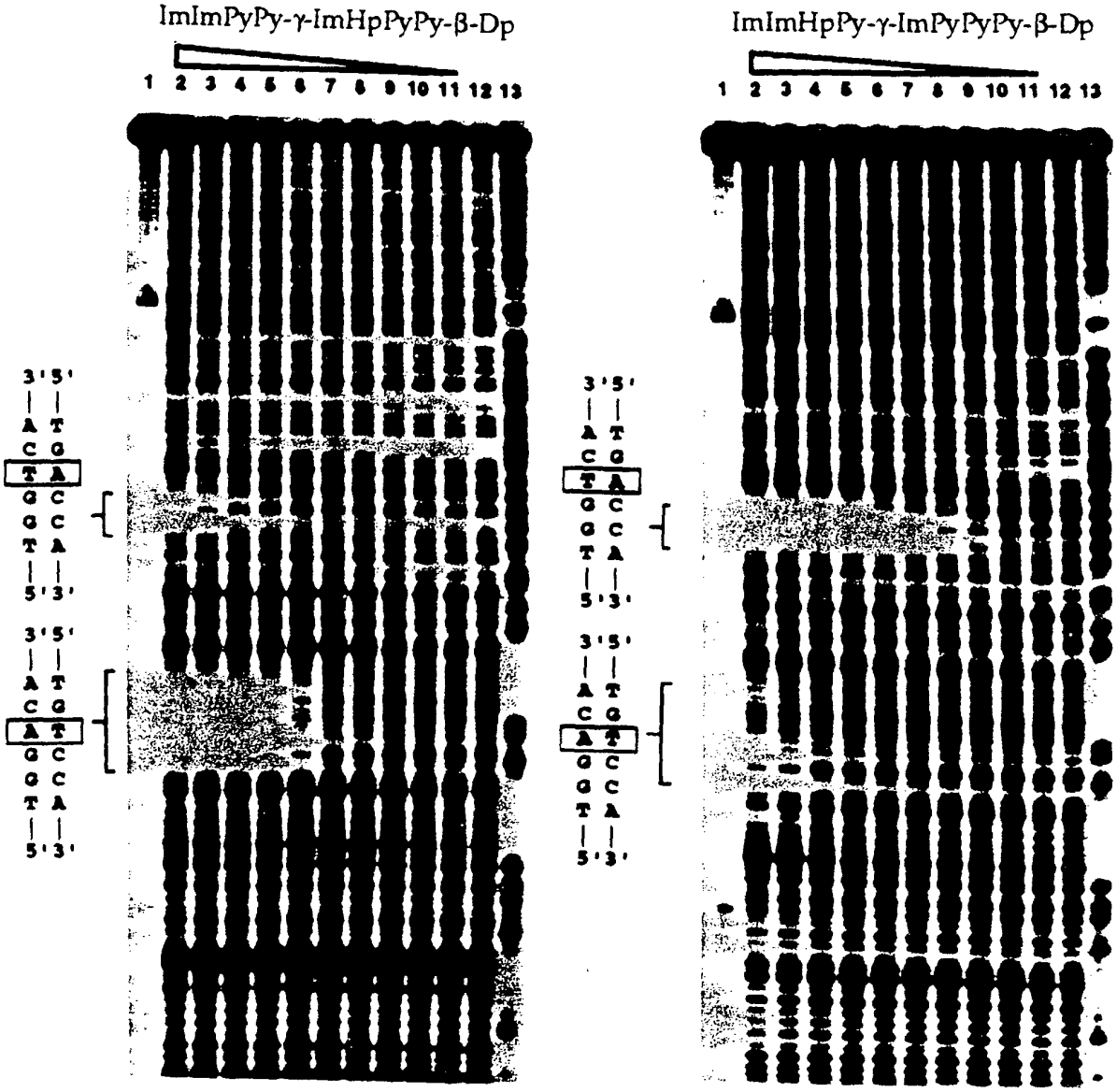
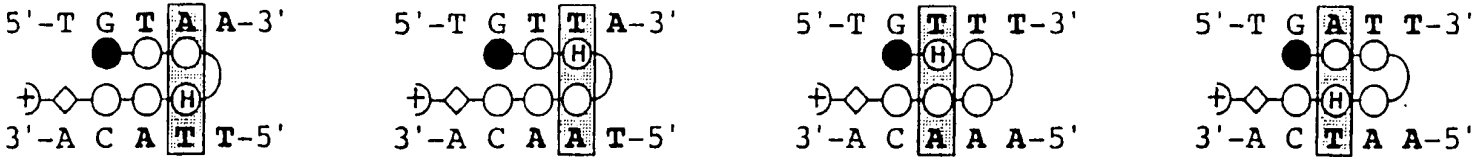
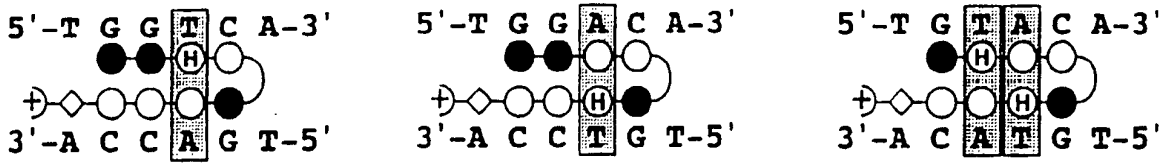

ImImPyPy-γ-ImHpPyPy-β-Dp
1 2 3 4 5 6 7 8 9 10 11 12 13
ImImHpPy-γ-ImPyPyPy-β-Dp
1 2 3 4 5 6 7 8 9 10 11 12 13

FIG. 3

6-Ring Hairpin Hp-Py-Im-Polyamides



8-Ring Hairpin Hp-Py-Im-Polyamides



10-Ring Hairpin Hp-Py-Im-Polyamides

FIG. 4

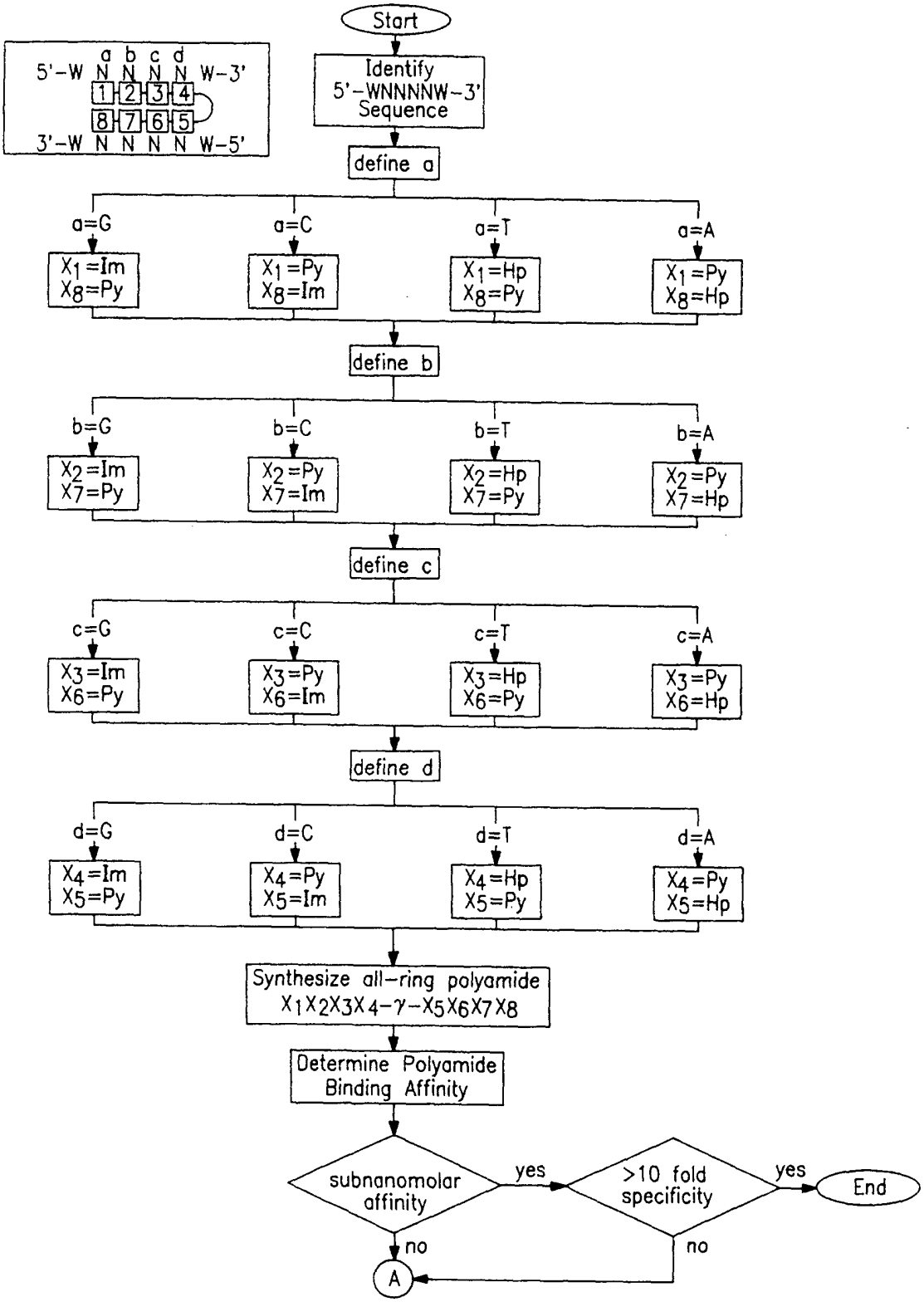


FIG. 5

SUBSTITUTE SHEET (RULE 26)

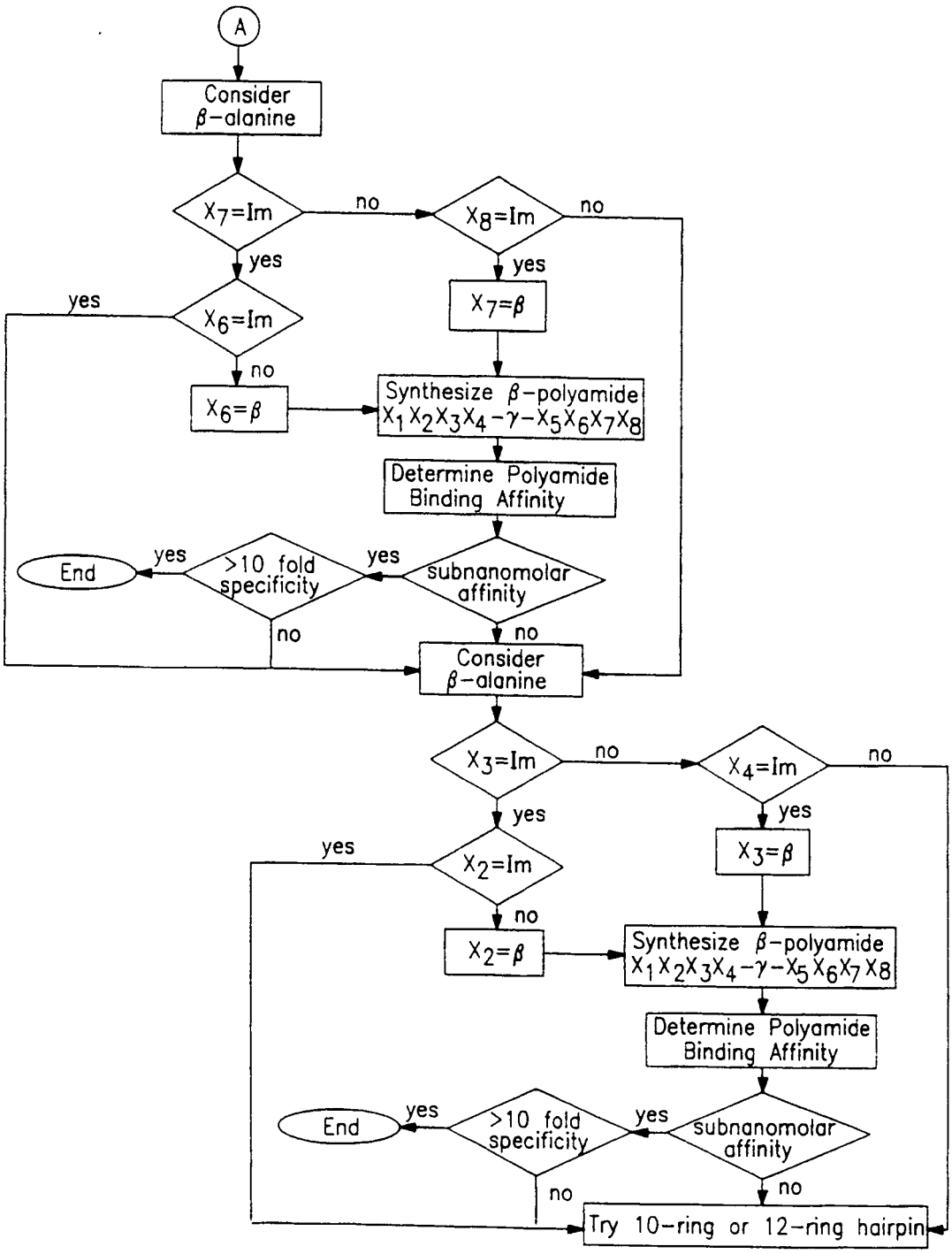


FIG. 6

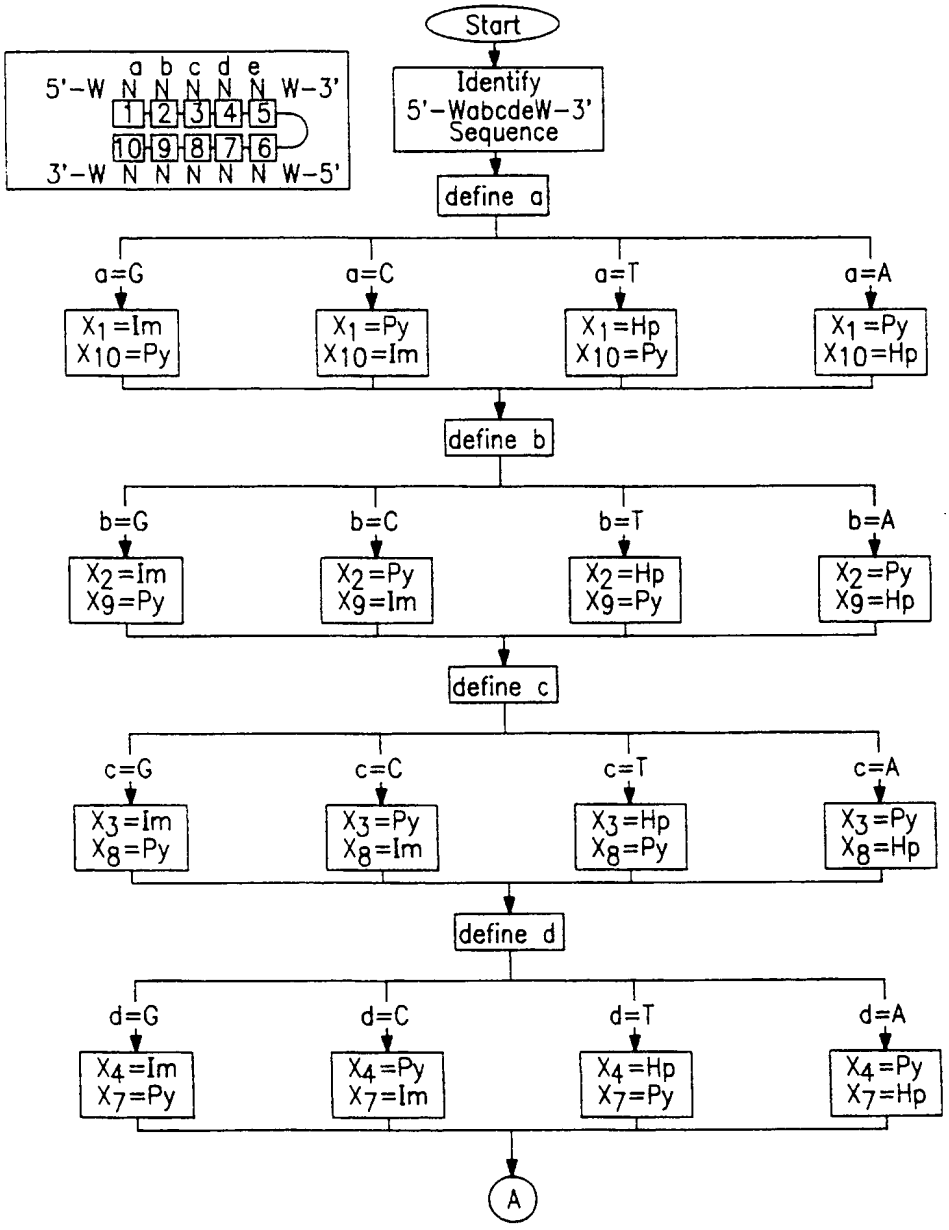


FIG. 7A

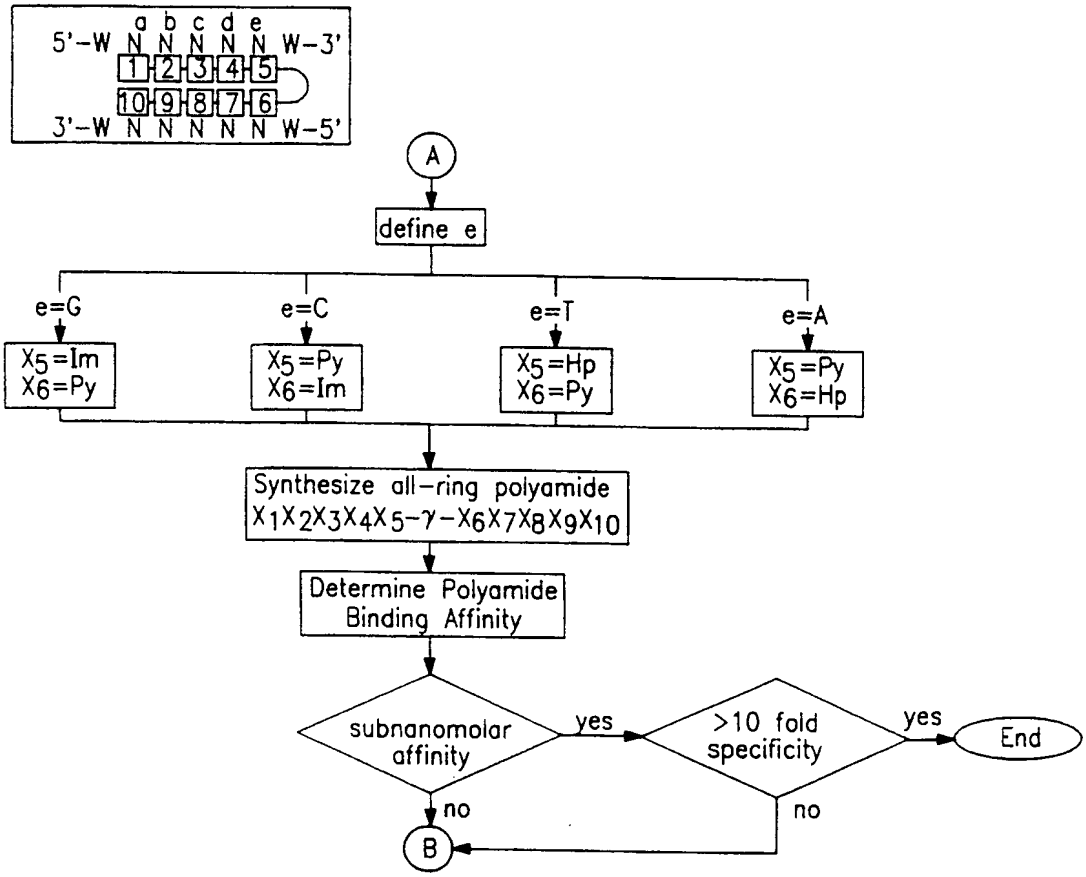


FIG. 7B

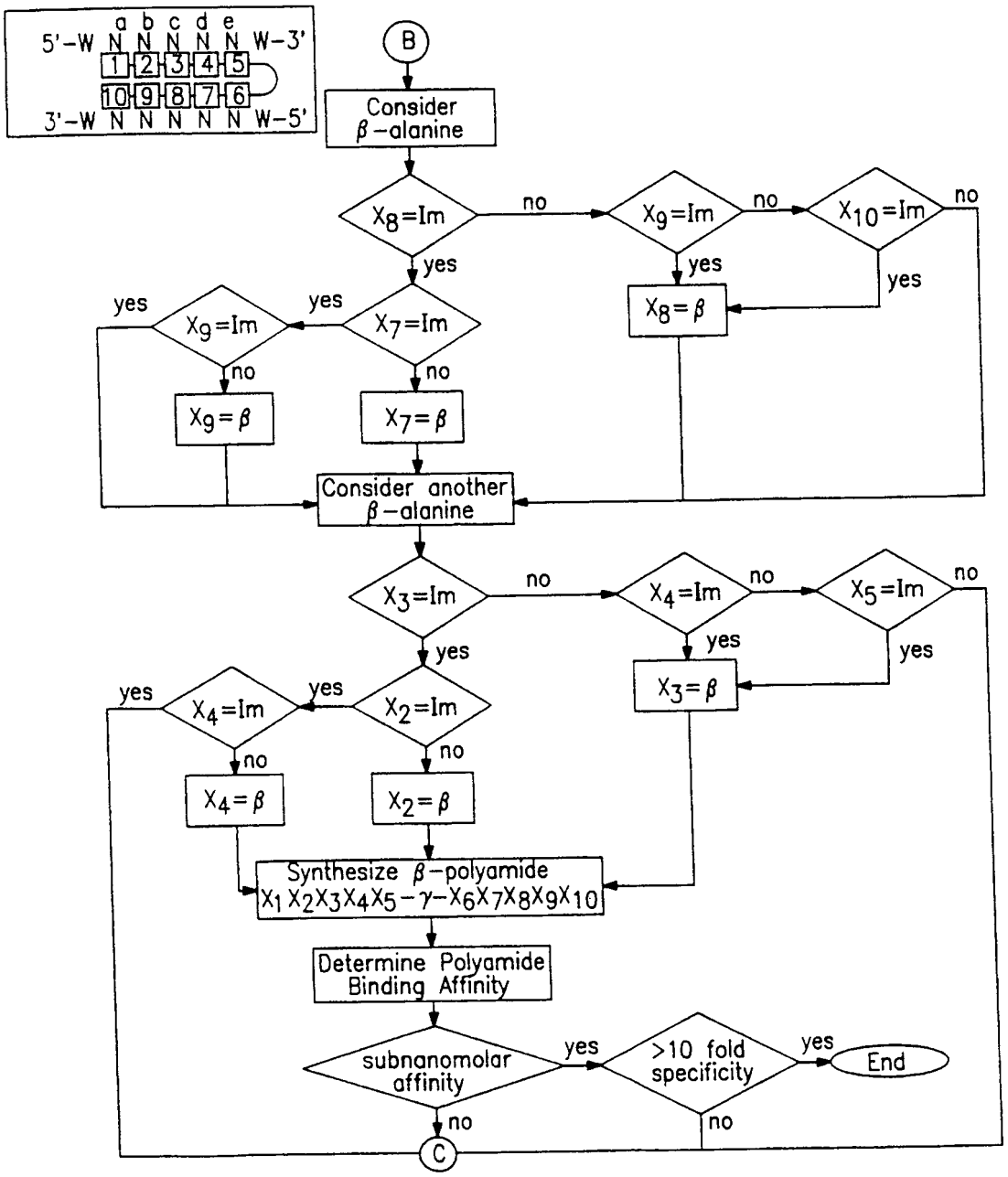

a b c d e
5'-W N N N N N W-3'
1 2 3 4 5
10 9 8 7 6
3'-W N N N N N W-5'
B
Consider β-alanine
X8=Im
no
X9=Im
no
X10=Im
no
yes
yes
yes
X8=β
yes
X9=Im
yes
X7=Im
no
no
X9=β
X7=β
Consider another β-alanine
X3=Im
no
X4=Im
no
X5=Im
no
yes
yes
yes
X3=β
yes
X4=Im
yes
X2=Im
no
no
X4=β
X2=β
Synthesize β-polyamide
X1X2X3X4X5-γ-X6X7X8X9X10
Determine Polyamide Binding Affinity
subnanomolar affinity
yes
>10 fold specificity
yes
End
no
no
C

FIG. 8

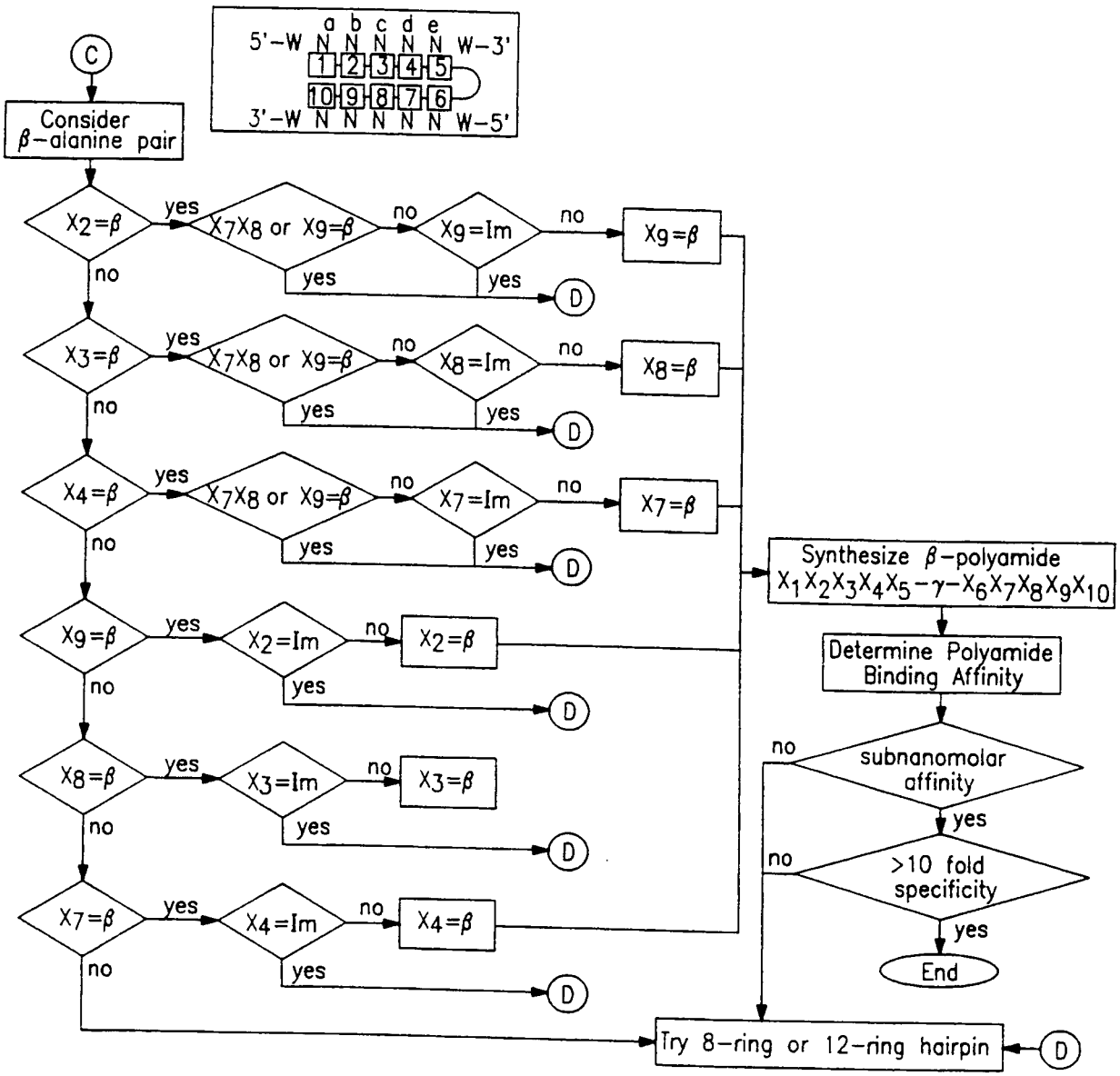


FIG. 9

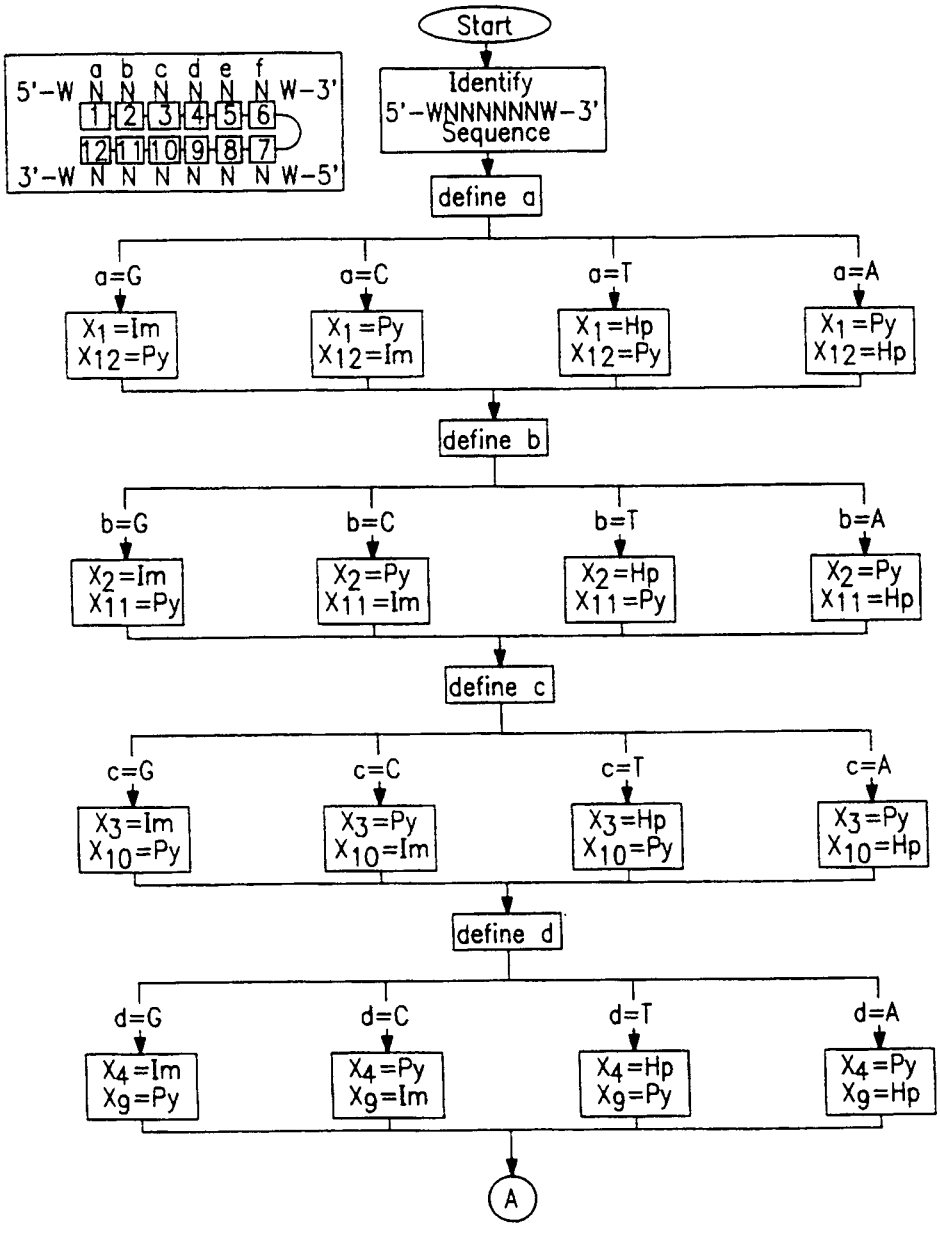

a b c d e f
5'-W N N N N N N W-3'
1 2 3 4 5 6
12 11 10 9 8 7
3'-W N N N N N N W-5'
Start
Identify
5'-WNNNNNNW-3'
Sequence
define a
a=G
X1=Im
X12=Py
a=C
X1=Py
X12=Im
a=T
X1=Hp
X12=Py
a=A
X1=Py
X12=Hp
define b
b=G
X2=Im
X11=Py
b=C
X2=Py
X11=Im
b=T
X2=Hp
X11=Py
b=A
X2=Py
X11=Hp
define c
c=G
X3=Im
X10=Py
c=C
X3=Py
X10=Im
c=T
X3=Hp
X10=Py
c=A
X3=Py
X10=Hp
define d
d=G
X4=Im
X9=Py
d=C
X4=Py
X9=Im
d=T
X4=Hp
X9=Py
d=A
X4=Py
X9=Hp
A

FIG. 10A

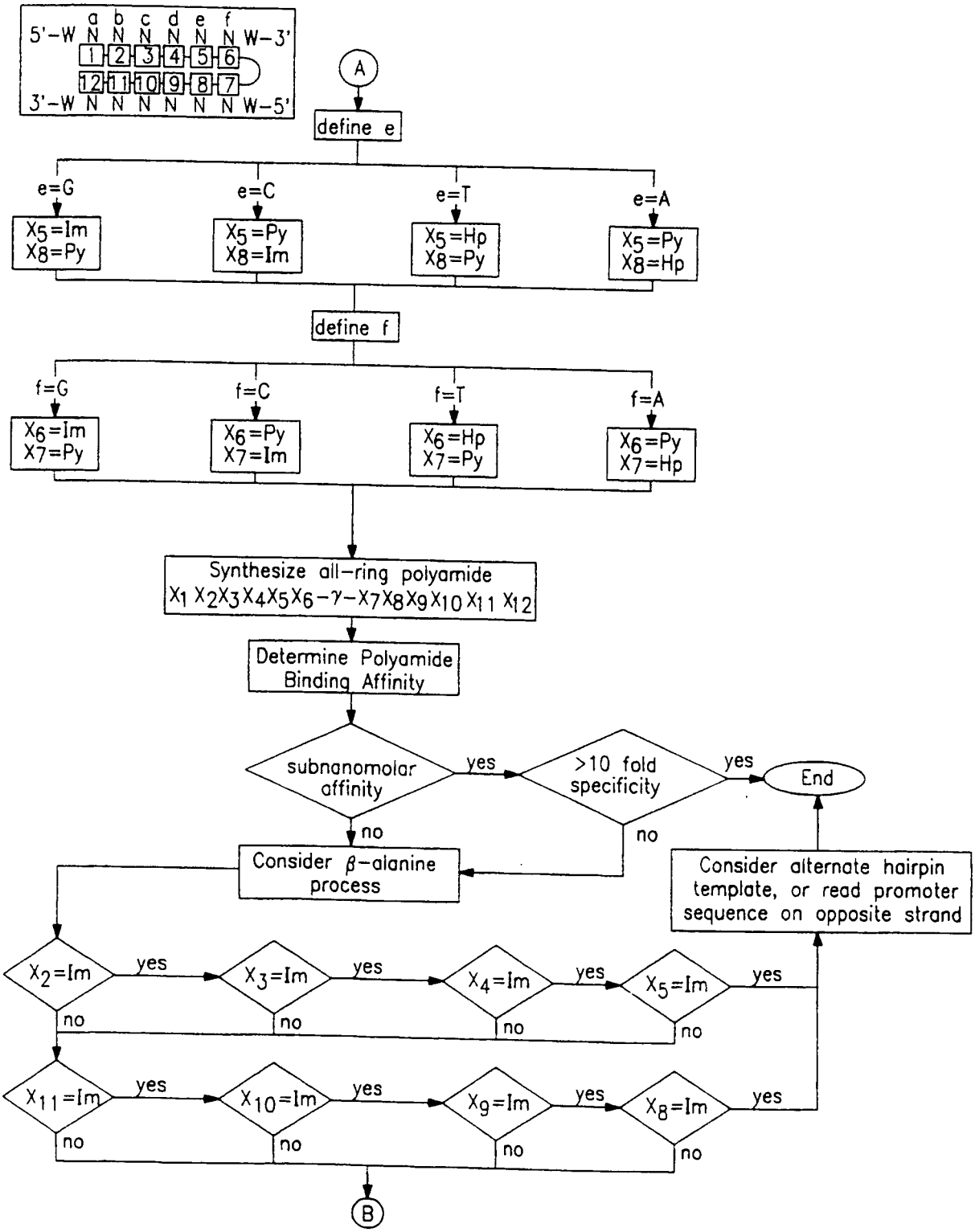


FIG. 10B

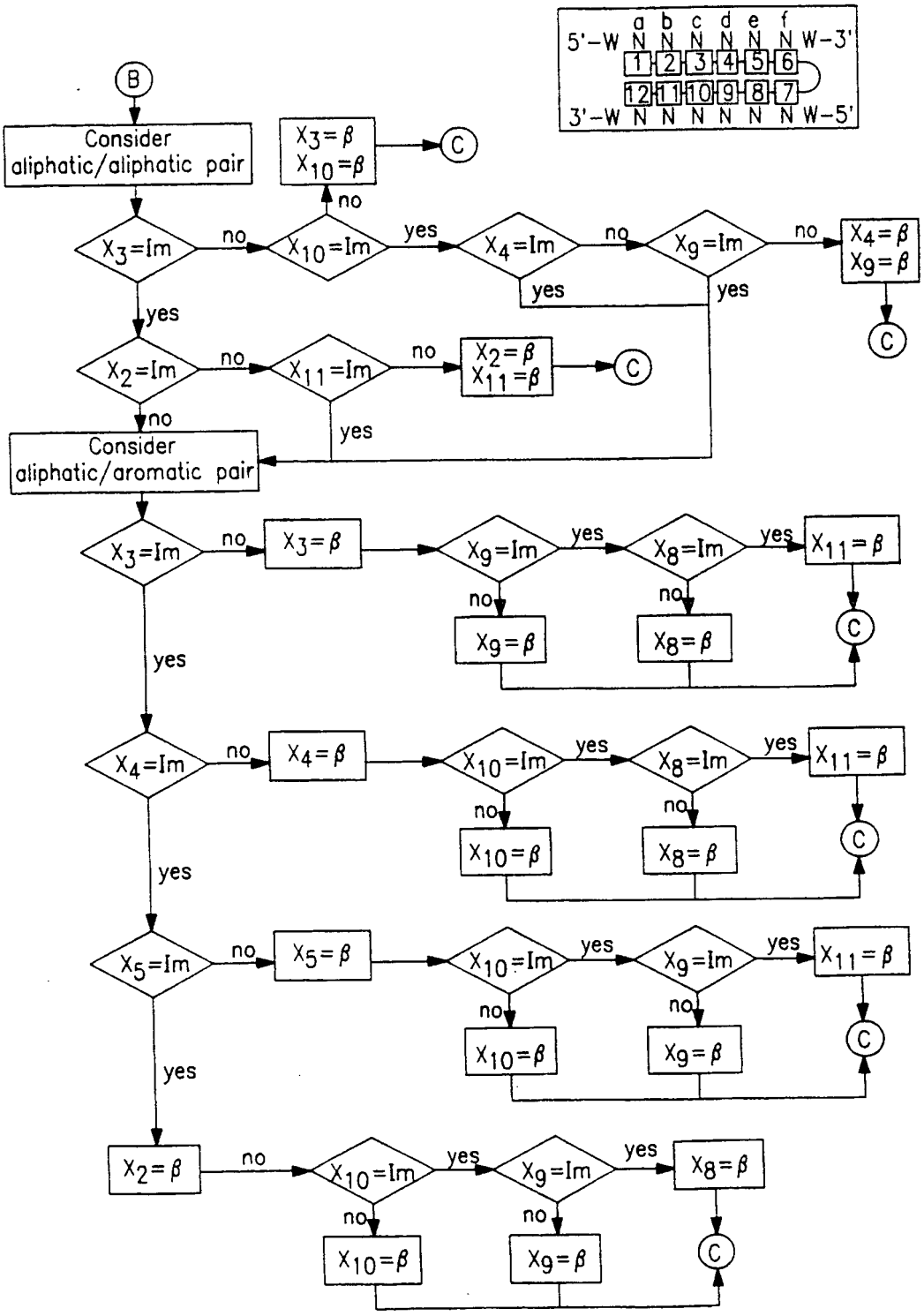

a b c d e f
5'-W N N N N N N W-3'
1 2 3 4 5 6
12 11 10 9 8 7
3'-W N N N N N N W-5'
B
Consider aliphatic/aliphatic pair
X3=β X10=β
C
X3=Im
no
X10=Im
yes
X4=Im
no
X9=Im
no
X4=β X9=β
yes
yes
yes
X2=Im
no
X11=Im
no
X2=β X11=β
C
no
yes
Consider aliphatic/aromatic pair
X3=Im
no
X3=β
X9=Im
yes
X8=Im
yes
X11=β
no
X9=β
no
X8=β
C
yes
X4=Im
no
X4=β
X10=Im
yes
X8=Im
yes
X11=β
no
X10=β
no
X8=β
C
yes
X5=Im
no
X5=β
X10=Im
yes
X9=Im
yes
X11=β
no
X10=β
no
X9=β
C
yes
X2=β
no
X10=Im
yes
X9=Im
yes
X8=β
no
X10=β
no
X9=β
C

FIG. 11A

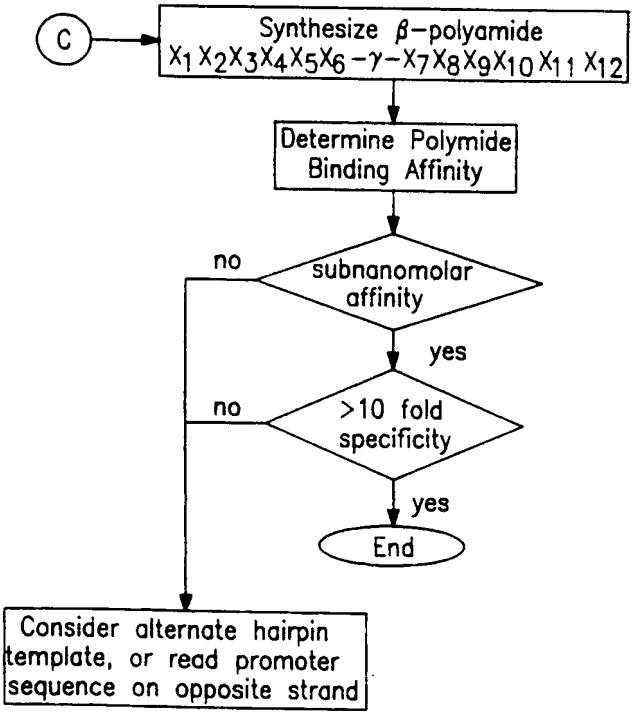


FIG. 11B

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 98/01714

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C07D207/34 C07D233/90 A61K31/415 C07D403/14 C12Q1/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 C07D A61K C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	J. W. TRAUGER ET AL: "Recognition of DNA by designed ligands at subnanomolar concentrations" NATURE, vol. 382, no. 6591, 8 August 1996, pages 559-561, XP002066256 cited in the application see the whole document ---	1-12, 42-48
X	E. B. BAIRD ET AL: "Solid phase synthesis of polyamides containing imidazole and pyrrole amino acids" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 118, no. 26, July 1996, pages 6141-6146, XP000674666 cited in the application see page 6141 - page 6142 ---	1-5, 42-48

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 May 1998	12.06.98

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Voyiazoglou, D

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Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Int[redacted]ional Application No
P[redacted]US 98/01714

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	S. E. SWALLEY ET AL: "Recognition of a 5'-(A,T)GGG(A,T)2-3' sequence in the minor groove of DNA by an eight-ring hairpin polyamide" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 118, no. 35, 4 September 1996, pages 8198-8206, XP002066377 see page 8198 - page 8202	1-12, 42-48
X	M. E. PARKS ET AL: "Optimization of the hairpin polyamide design for recognition of the minor groove of DNA" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 118, no. 26, July 1996, pages 6147-6152, XP000674668 see page 6147 - page 6148	1-5, 42-48
X	M. E. PARKS ET AL : "Recognition of 5'-(A,T)GG(AT)2-3' sequences in the minor groove of DNA by hairpin polyamides" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 118, no. 26, July 1996, DC US, pages 6153-6159, XP000674667 see page 6153 - page 6155	1-5, 42-48
P,X	S. E. SWALLEY ET AL : "Discrimination of 5'-GGGG-3', and 5'-GGCC-3' sequences in the minor groove of DNA by eight-ring hairpin polyamides" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 119, no. 30, 30 July 1997, DC US, pages 6953-6961, XP002066260 see page 6959 - page 6961	1-12, 42-48
P,X	W. L. WALKER ET AL: "Estimation of the DNA sequence discriminatory ability of hairpin-linked lexitropsins" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES,U.S.A., vol. 94, no. 11, May 1997, pages 5634-5639, XP002066261 see table 1	1-12, 42-48
A	WO 96 05196 A (PHARMACIA) 22 February 1996 see claim 1	1-12, 16-40, 42-48

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Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 98/01714

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.: 13-15,41
because they relate to subject matter not required to be searched by this Authority, namely:

The claim is so broad that for determining the scope of a meaningful search due account has been taken of rule 33.3 PCT; special emphasis was put on the following subject-matter: claims 1-12,16-40,42-48; pages 1-22; figures

2. [ ] Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 98/01714

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO 9605196 A	22-02-1996	AU	689623 B	02-04-1998
		AU	3113695 A	07-03-1996
		CA	2172629 A	22-02-1996
		CN	1131946 A	25-09-1996
		EP	0722446 A	24-07-1996
		FI	961506 A	05-06-1996
		HU	76267 A	28-07-1997
		JP	9504039 T	22-04-1997
		NO	961377 A	30-05-1996
		NZ	290404 A	24-04-1997
		PL	313821 A	22-07-1996
		ZA	9506590 A	18-03-1996